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Leadership and Management Skills in
SMEs: Measuring Associations with
Management Practices and
Performance

Technical report

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Executive Summary

Leadership and management skills in UK SMEs

There is an increasingly widespread view that deficiencies in leadership and management and skills (L&M skills) are a key constraint on business performance in the UK, especially for small and medium sized enterprises (SMEs). However, the available evidence relating to UK SMEs is limited and partial.

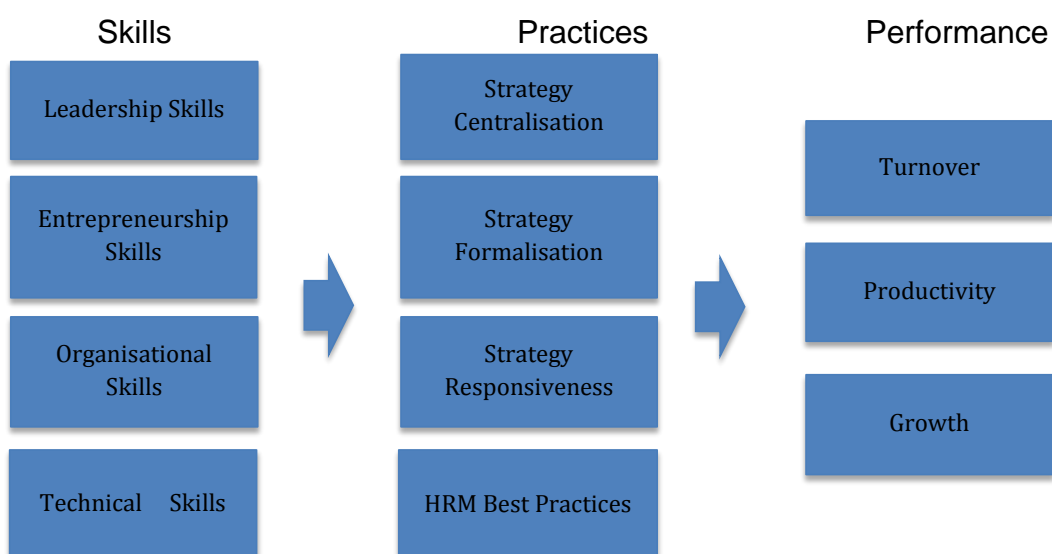
Recent data from the Chartered Institute of Personnel and Development shows that nearly three-quarters of SMEs in England report a deficit in L&M Skills. It has also been demonstrated that effective management practices help explain differences in firm level performance and underlie international variations in economic performance. However, there is very little evidence showing whether or how L&M skills influence the adoption of management best practices or how they ultimately shape business performance in SMEs.

This research

This research involved a survey of approximately 2,500 English SMEs with between five and 250 employees across all sectors of the economy. It examined the associations between L&M skills and the implementation of management best practices and how these factors are related to business performance and employment growth.

The SME sector is very diverse and the different skills sets and management practices most relevant to individual businesses vary according to the nature of the business and the context in which it operates. To accommodate this broad scope, the research considered four widely relevant dimensions of L&M skills and four sets of management practices. These skills and practices were related to three measures of firm performance: turnover, productivity and employment growth (see figure A).

Figure A: A framework of skills, practices and firm performance



Leadership skills – motivating and influencing others and delegating work.

Entrepreneurship skills – identifying customer needs, technical or market opportunities, and pursuing opportunities.

Technical skills – expertise in a technical or functional area, developing technically superior solutions.

Organisational skills – organising resources, coordinating tasks.

Strategy formalisation - the extent to which there are formal processes in place for planning and setting strategy.

Strategy responsiveness - the extent to which strategic planning is adaptive in response to new information from a wide variety of sources including employees.

Strategy centralisation - the extent to which strategic planning is conducted by a small group or an individual.

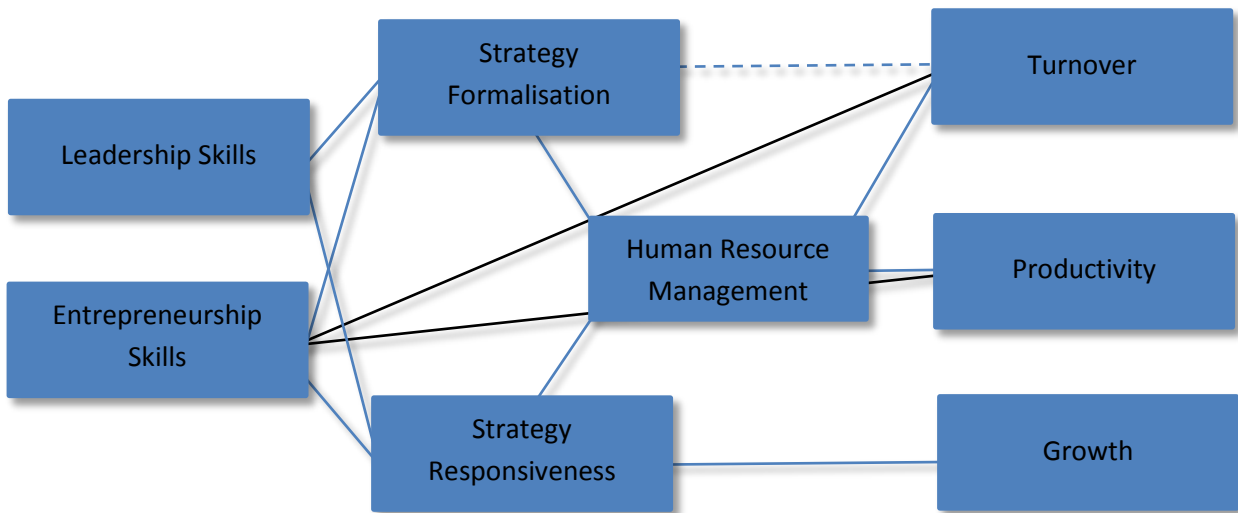
Human Resource Management best practices – selective staffing, investments in training, variable compensation, employee ownership, performance management, information sharing, and employee participation in decision-making.

Key findings

The research findings show that skills levels and the adoption of best practices are uneven across the SMEs sector and that there are long tails of businesses with poorly developed skills and which do not use management best practices.

The research also shows that variations in leadership and management skills are associated with variations in SME performance; both directly and indirectly through an increased propensity to adopt management best practices. The findings also show which dimensions of L&M skills and which elements of management best practice are most closely associated with improved performance outcomes (see figure B).

Figure B: Linking skills to performance: positive associations identified between skills sets, management practices and performance outcomes.



All lines shown are positive and statistically significant associations at $p < .05$ except dotted line which is significant at $p < .10$. Black lines depict direct associations between skills and performance. Control variables and negative associations are not shown.

The prevalence of under-developed skills and non-implementation of best practice.

- The data shows that for most skills and practices, there are **'long tails'** of businesses that have relatively **under-developed L&M skills and which fail to implement management best practices**.

Associations between skill sets, management practices and performance.

- The skill sets most consistently and strongly associated with good management practice and SME performance are **entrepreneurship skills** and **leadership skills**.
- Across all firm types and contexts, the **entrepreneurship skills** of top managers are positively and significantly associated with turnover and productivity.
- **Leadership and entrepreneurship skills** are positively related to strategy formalisation and responsiveness – key drivers of performance and growth.
- **Strategy formalisation** is positively associated with turnover while **strategy responsiveness** is positively associated with firm growth.
- **Best practice strategic management** is also related to the implementation of best practices in **human resource management** (HRM) - which are in turn, positively and significantly associated with turnover and productivity.
- **Skills differences are more important than structural (e.g. industry sector) and contextual factors (e.g. ownership, age and size)** for explaining the 'long tail' in implementation of best practices.

Which businesses could achieve the greatest benefits from improved L&M skills?

- The overall impact of L&M skills on firm performance tend to be particularly strong for firms with between five and 19 employees.
- The impact of HRM practices on performance is strongest among businesses with between 50 and 99 employees.

Relevance of the findings

These findings are policy relevant. They provide an evidence-based rationale for possible policy development and an informed basis for thinking about what policy options might be appropriate. The results clearly demonstrate that L&M skills are relatively under-developed in many SMEs. This is important because they also show that well-developed skills and the adoption of associated management best practices are positively related to firm performance. In this sense, the evidence shows that under-developed L&M skills and a widespread failure to adopt management best practices are constraining the performance and growth of a large number of English SMEs.

The estimates of skills used in the study are self-reported by the owner/managers interviewed. This is important because it testifies to a recognised need for development amongst these individuals.

The research also informs thinking about the possible policy options available. It demonstrates which aspects of L&M skills are the most important in terms of improving firm performance, which practices are influential, and which categories of business might achieve the greatest benefits from skills-enhancing investments.

Introduction

Historically, public policy related to business performance and growth has tended to focus on tangible measures such as improving access to finance, encouraging and enabling the use of business support and reducing regulatory burdens. However, there is a growing recognition that other less tangible factors such as management knowledge and skills and the implementation of best management practices also represent important drivers of growth.

It is commonly noted that smaller and closely held firms (i.e., those owned by just one or a few individuals, and including family firms) lag behind in terms of the management 'best practices' employed in large organisations. However, little is known about the reason for this lag other than 'newness' and 'smallness'. While it may reasonably be assumed that the cause is a lack of managerial knowledge and skills, others have noted that variations in adoption of best management practices may not be a result of lack of knowledge¹. However, there is also evidence that many owners and senior managers in English SMEs recognise that their skills are underdeveloped². Recent research has also shown that relative to firms in the United States, there is a 'long tail' of firms that do not implement best management practices and also that variations in the adoption of world-class practices may have significant implications for the performance of firms and whole economies³. This represents both a challenge and an opportunity for significant improvement in the growth prospects of UK enterprises.

While there is consensus concerning the value of human capital for performance, especially in early stage ventures⁴, existing evidence has focused on broad proxies for human capital such as education and experience. Existing research has little to say about whether specific leadership and management skills play a significant role in the development of effective management practices, or which skills might be most important in improving firm performance in UK SMEs. In order to further examine these issues, we have conducted a large-scale study designed to evaluate the relationship between leadership and management skills, management practices, and performance in SMEs in the UK.

¹ Pfeffer, Jeffrey, and Robert I. Sutton. "Knowing what to do is not enough: turning knowledge into action." *California management review* 42, no. 1 (1999): 83-108.

² CIPD Annual Learning and Talent Development Survey Report 2012.

³ Bloom, Nicholas, Christos Genakos, Raffaella Sadun, and John Van Reenen. "Management practices across firms and countries." *The Academy of Management Perspectives* 26, no. 1 (2012): 12-33.

⁴ Unger, Jems M., Andreas Rauch, Michael Frese, and Nina Rosenbusch. "Human capital and entrepreneurial success: A meta-analytical review." *Journal of Business Venturing* 26, no. 3 (2011): 341-358.

Key Points from Existing Literature

Leadership and Management Skills

There has been a long history of research that asks *what do managers do*, and how their knowledge and skills influence personal and organisational outcomes⁵. However, there is a significant lack of research on L&M skills in the context of SMEs.

A skill is the ability to do something effectively and involves a system of specific behaviours that help achieve an objective, or standard of performance. There are numerous typologies of managerial skills. In an influential framework, Katz⁶ proposed three dimensions of technical, human and conceptual skills. Technical skills are those specific skills required for performing a specialised task, and often involve working with 'things' rather than working with people. Technical skills remain important for managers even when they perform relatively few technically specialised tasks themselves, because they enable the manager to effectively acquire, develop, organise, and control the human resources needed to accomplish organisational objectives. Human or 'people related' skills include communication, influence, coordination and cooperation with others. These skills are required for the direct management of other people. Conceptual skills reflect an understanding of the wider organisation, strategy, structure, and its functioning as a whole within the environment. Conceptual skills support effectiveness by ensuring that managerial decisions and actions accord with organisational goals, are consistent with environmental opportunities and resource constraints, and are appropriate within the formal and informal organisational structure. According to Katz, these three skill dimensions capture the full spectrum of specific skills required by managers in large organisations. In large organisations, the importance of specific skill sets is expected to vary according to managerial level: technical skills are most salient at lower levels, human skills at intermediate levels, and conceptual skills are of greatest significance for senior managers. The implicit corollary is that all three sets of skills are likely to be valuable for managers in small organisations.

The three dimensions proposed by Katz are now a widely accepted approach to classifying managerial skills in general terms. For example, Boyatzis⁷ found that the skills significant to managerial performance were interpersonal skills (building networks, coalitions, gain cooperation, resolve conflicts, influence others, group process skills), oral presentation skills (symbolic, verbal, nonverbal communication), and conceptual skills (inductive reasoning, pattern recognition, ability to convey meaning through metaphors, models and analogies, ability to create solutions and novel insights, deductive reasoning).

⁵ Cynthia M Pavett and Alan W Lau, "Managerial Work: the Influence of Hierarchical Level and Functional Specialty," *Academy of Management Journal* 26, no. 1 (July 31, 1983): 170–177.

⁶ Katz, Robert Lee. *Skills of an effective administrator*. Harvard Business Press, 1974.

⁷ Richard E. Boyatzis. *The competent manager: A model for effective performance*. John Wiley & Sons, 1982.

Thus, while defined slightly differently, the skills found by Boyatzis' are compatible with the technical, human and conceptual categories.

Based upon a synthesis of the management skills described in 23 management text books, Peterson and Van Fleet⁸ elaborated Katz's three dimensions into ten more refined sub-dimensions of technical, analytical, and decision making (the technical dimension), human, communication and interpersonal (the human dimension), and conceptual, flexible and diagnostic (the conceptual dimension) with the tenth reflecting administrative skills. These are summarised and defined in Table 1. As with the majority of theoretical and empirical work in this domain, Peterson and Van Fleet's analysis applies more readily to larger organisations and the definition of administrative skills seems particularly applicable to the roles of lower level managers.

No measure has been developed to capture this more refined framing of Katz's original three dimensions. Furthermore, notably absent from both Katz and Peterson and Van Fleet's work are strategic management or entrepreneurial skills⁹ which may reflect the tendency for these models to be more relevant to managers in large organisations than SMEs.

Shipper and Davy¹⁰ identify six skill dimensions that (a) appear in more than 50 per cent of the models that they reviewed, (b) are defined consistently across models, and (c) have face validity. The six skill dimensions are:

1. Participation (encouraging upward communication),
2. Facilitation (coaching, training and supporting others),
3. Recognising and rewarding the performance of others,
4. Planning, preparing and maintaining the workflow of the unit,
5. Time emphasis (setting appropriate deadlines), and
6. Controlling (monitoring and correcting performance of others).

The Shipper and Davy framework thus emphasises the organisational skills that Katz refers to as conceptual, and the interpersonal leadership skills that Katz refers to as human skills.

⁸ Peterson, Tim O., and David D. Van Fleet. "The ongoing legacy of RL Katz: An updated typology of management skills." *Management decision* 42, no. 10 (2004): 1297-1308.

⁹ Mintzberg, Henry. "The nature of managerial work". New York: Harper Row

¹⁰ Shipper, Frank, and Jeanette Davy. "A model and investigation of managerial skills, employees' attitudes, and managerial performance." *The Leadership Quarterly* 13, no. 2 (2002): 95-120.

Table 1: Ten Dimensions of Managerial Skills According to Peterson and Van Fleet

Skill	Definition
Technical	Ability to use methods, procedures, processes, tools, techniques and specialised knowledge to perform specific tasks
Analytic	Ability to identify key variables, see how they are interrelated, and decide which ones should receive the most attention
Decision Making	Ability to choose effective solutions from among alternatives
Human	Ability to work cooperatively with others, to communicate effectively, to motivate and train others, to resolve conflicts and be a team player
Communication	Ability to send and receive information, thoughts, and feelings, which create common understanding and meaning
Interpersonal	Ability to develop and maintain a trusting and open relationship with superiors, subordinates and peers to facilitate the free exchange of information and provide a productive work setting
Conceptual	Ability to see the organisation as a whole and to solve problems from a systemic point of view
Diagnostic	Ability to determine the probable cause of a problem from examining the symptoms which are observed by a manager
Flexible	Ability to deal with ambiguous and complex situations and rapidly changing demands
Administrative	Ability to follow policies and procedures, process paper work in an orderly manner, and manage expenditures within the limit set by budgets

Leadership and Management Skills in SMEs

There is far less research on L&M skills in SMEs. However, the work that has been conducted highlights some additional dimensions of skills that are particularly relevant to this context. Chandler and Jansen¹¹ examined three sets of skills, technical-functional, managerial and entrepreneurial in a new venture context. The technical-functional and managerial skills are derived from Katz¹² while entrepreneurial skills were defined in terms of opportunity recognition and pursuit. Chandler and Jansen report a close association between managerial and technical skills and profitability; and between entrepreneurial skills and growth.

¹¹ Chandler, Gaylen N., and Erik Jansen. "The founder's self-assessed competence and venture performance." *Journal of Business venturing* 7, no. 3 (1992): 223-236.

¹² Katz, Robert Lee. *Skills of an effective administrator*. Harvard Business Press, 1974.

In a study of small organisations (Kibbutzim) in Israel, Carmeli and Tishler¹³ found that people related skills were most consistently associated with performance across contexts. In a series of studies, Baum and colleagues¹⁴ found that general competencies of CEOs (organisational skills, opportunity recognition skills) were indirectly related to venture growth, in particular through their impact upon goal setting. Baum and colleagues also report that technical and industry specific competencies were directly associated with venture growth. Baum and Locke found that 'new resource skill' defined as "the ability to acquire and systematise the operating resources needed to start and grow an organisation" was associated with venture growth both directly, and indirectly via its impact on motivation and the communication of vision. In an earlier study, Baum *et al* had identified the communication of vision as an important skill for venture growth.

Taken together, prior research suggests the value of considering entrepreneurial skills in addition to more traditional dimensions of managerial and leadership skills. Such skills include identification and development of opportunities, the communication of entrepreneurial vision, and the acquisition and orchestration of the necessary resources. L&M skills are expected to influence performance and growth through their impact on the adoption of management practices associated with the acquisition, organisation and mobilisation of key resources.

Leadership and Management Skills and Performance

There is some evidence that, in the context of large organisations, the skills of individual managers influence performance (individual and unit) and career success. For example, in one of the most rigorous causal tests of the skills hypothesis ever conducted, Bray and colleagues¹⁵ examined the career progression of assessment centre candidates at AT&T over a period of 8 and 20 years. They found that in addition to a range of specific traits, the cognitive, administrative and interpersonal skills of managers predicted career advancement through middle management.

In a meta-analysis of the association between human capital and *entrepreneurial success*, Unger and colleagues¹⁶ find a small but statistically significant correlation ($r=.098$) between human capital and entrepreneurial success defined as the profitability and growth of entrepreneurial new ventures, including financial and employment growth. The strength of the observed correlation was greater for knowledge and skills than for education and

¹³ Carmeli, A., and A. Tishler. "An empirical analysis of the relative importance of managerial skills of the firm's top management team." *International Journal of Manpower* 27, no. 1 (2006): 9-36.

¹⁴ J Robert Baum and Edwin A Locke, "The Relationship of Entrepreneurial Traits, Skill, and Motivation to Subsequent Venture Growth.," *Journal of Applied Psychology* 89, no. 4 (2004): 587–598, doi:10.1037/0021-9010.89.4.587; J Robert Baum, Edwin A Locke, and Shelley A Kirkpatrick, "A Longitudinal Study of the Relation of Vision and Vision Communication to Venture Growth in Entrepreneurial Firms.," *Journal of Applied Psychology* 83, no. 1 (January 13, 1998): 43–54; J Robert Baum, Edwin A Locke, and Ken A Smith, "A Multidimensional Model of Venture Growth," *Academy of Management Journal* 44, no. 2 (October 10, 2001): 292–303.

¹⁵ Bray, Douglas Weston, Richard J. Campbell, and Donald L. Grant. *Formative years in business: A long-term AT&T study of managerial lives*. Wiley-Interscience, 1974.

¹⁶ Unger et al., "Human Capital and Entrepreneurial Success: a Meta-Analytical Review."

experience. Skills were more predictive of firm size than of financial performance, and the correlation was stronger for younger firms than for more established firms all else equal. This meta-analytic evidence is useful for suggesting important moderators of the association between L&M skills and performance. That is, in order to estimate the strength of association between skills and outcomes, it is important to consider how firm age and size may alter this association. Furthermore, these results suggest that results may vary according to the measure of performance used.

In sum, existing literature suggests that an expectation of a positive association between L&M skills and performance is theoretically reasonable, although there have been few empirical studies that rigorously test such an association. Furthermore, there is reason to expect that the association will be an indirect one, acting through the development of effective management practices¹⁷.

Management Practices in SMEs

Firm growth is dependent upon the development of organisational capabilities, for example, for organisational control, continuous improvement, innovation, and market development. Leader beliefs about organisational efficacy are critical to undertaking risky investments¹⁸. The skills of the management team are expected to impact decisions to invest for growth.

A difficulty of measuring practices is the fact that only a few practices might be considered generalizable across diverse contexts. Thus, one challenge with focusing on management practices is that in order to standardise measures, it is necessary to ignore a wide range of practices that have been found to influence performance (e.g., financial management, marketing etc.)¹⁹. A second challenge is that this approach to the measurement of practices also ignores the interaction and complementarity (synergistic effects) of using

¹⁷ Baum and Locke, "The Relationship of Entrepreneurial Traits, Skill, and Motivation to Subsequent Venture Growth.."

¹⁸ Martin, Geoffrey, Nathan Washburn, Marianna Makri, and Luis R. Gomez-Mejia. "Not all Risk Taking is Born Equal: The Behavioral Agency Model and CEO's Perception of Firm Efficacy." *Human Resource Management* (2014).

¹⁹ Raffaella Cagliano, Kate Blackmon, and Chris Voss, "Small Firms Under MICROSCOPE: International Differences in Production/Operations Management Practices and Performance," *Integrated Manufacturing Systems* 12, no. 6 (June 24, 2001): 469–482; M J Peel and N Wilson, "Working Capital and Financial Management Practices in the Small Firm Sector," *International Small Business Journal* 14, no. 2 (January 1, 1996): 52–68, doi:10.1177/0266242696142004; Brian S Klaas et al., "High-Performance Work System Implementation in Small and Medium Enterprises: a Knowledge-Creation Perspective," *Human Resource Management* 51, no. 4 (July 27, 2012): 487–510, doi:10.1002/hrm.21485; S C Lenny Koh et al., "The Impact of Supply Chain Management Practices on Performance of SMEs," *Industrial Management & Data Systems* 107, no. 1 (2007): 103–124, doi:10.1108/02635570710719089; Jake G Messersmith and James P Guthrie, "High Performance Work Systems in Emergent Organizations: Implications for Firm Performance," *Human Resource Management* 49, no. 2 (March 2010): 241–264, doi:10.1002/hrm.20342; Jill Collis and Robin Jarvis, "Financial Information and the Management of Small Private Companies," *Journal of Small Business and Enterprise Development* 9, no. 2 (2002): 100–110, doi:10.1108/14626000210427357; James C Hayton, "Strategic Human Capital Management in SMEs: an Empirical Study of Entrepreneurial Performance," *Human Resource Management* 42, no. 4 (March 26, 2004): 375–391, doi:10.1002/hrm.10096; Jay J Ebben and Alec C Johnson, "Efficiency, Flexibility, or Both? Evidence Linking Strategy to Performance in Small Firms," *Strategic Management Journal* 26, no. 13 (2005): 1249–1259, doi:10.1002/smj.503.

systems, bundles or configurations of specific practices²⁰. In addition, while measurement of formal practices may be applicable to medium and large firms, this approach becomes more challenging in micro and small firms where practices are necessarily more informal. A further consideration is that there is a significant association between several relevant variables and the use of practices. Ownership, firm size, labour market regulation, the market for corporate control, all exert external influences upon the implementation of practices that is independent of management and leadership skills²¹.

However, despite all of these concerns, there is reason to expect that managerial practices are an important intermediate link in the chain between L&M skills and performance and growth in SMEs. The evidence suggests that an important aspect of management practice to consider is the capacity of acquiring, organisation and mobilising resources²². Two types of practice are of universal applicability across industry sectors: strategic management and human resource management (HRM). According to the 2013 Growth Accelerator Annual report, the two most commonly cited concerns of SME owner-managers are business strategy (cited by 40%) and people and skills (cited 39%).

There is evidence that strategic management capabilities vary across firms, and that they are an important driver of performance²³. Through business strategy, managers provide direction, motivate and inspire, evaluate and control, empower and enable, or endorse and sponsor.²⁴ In turn, strategic management capabilities are expected to be associated with firm performance, even in SMEs²⁵. Strategic management capabilities represent a set of practices, varying in formalisation, centralisation and responsiveness to external and internal information, which generalise across settings, and types of business; variations in which are expected to be associated with L&M skills, and with performance; and which reflect the core processes of resource acquisition, organisation and mobilisation²⁶.

There is also extensive evidence of the relationship between HRM and firm performance²⁷. The bulk of this evidence points to a set of *High Performance Work Practices* also known

²⁰ Huselid, Mark A., "The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance.," *Academy of Management Journal* 38, no. 3 (1995): 635–672.

²¹ Bloom et al., "Management Practices Across Firms and Countries."

²² Baum and Locke, "The Relationship of Entrepreneurial Traits, Skill, and Motivation to Subsequent Venture Growth.."

²³ Hart, Stuart and Catherine Banbury, "How Strategy-Making Processes Can Make a Difference," *Strategic Management Journal* 15, no. 4 (September 20, 1994): 251–269;; George Stalk, Philip Evans, and Lawrence E Shulman, "Competing on Capabilities: the New Rules of Corporate Strategy," *Harvard Business Review*, January 17, 1992; S Floyd, "Middle Management Involvement in Strategy and Its Association with Strategic Type: a Research Note," *Strategic Management Journal* (1992).

²⁴ Hart and Banbury, "How Strategy-Making Processes Can Make a Difference;" Ebben and Johnson, "Efficiency, Flexibility, or Both? Evidence Linking Strategy to Performance in Small Firms."

²⁵ Ebben and Johnson, "Efficiency, Flexibility, or Both? Evidence Linking Strategy to Performance in Small Firms."

²⁶ Baum, Locke, and Smith, "A Multidimensional Model of Venture Growth."

²⁷ Combs, Joseph, Y Liu, and A Hall, "How Much Do High-Performance Work Practices Matter? a Meta-Analysis of Their Effects on Organizational Performance," *Personnel Psychology* (2006).

as high performance work systems or high commitment HRM²⁸, which influence performance by enhancing employee commitment, reducing turnover, improving productivity and therefore promote efficiency and effectiveness. These practices also have benefits for entrepreneurial behaviour and innovation in organisations²⁹. Furthermore, the evidence is strong that this performance benefit of HRM also applies to SMEs³⁰.

Measurement Issues

There are significant empirical challenges when it comes to the measurement of management and leadership skills. First, evaluations of capability made by the self versus those made by others are imperfectly correlated.³¹ However, it is important to point out that a lack of interrater reliability is not unique to measures of skills and is also evident for measures of practices.³² Second the methods and purposes of measurement impact the extent of bias in assessments. Error is reduced when measurement methods limit the influence of self-enhancement bias.³³ Finally, since many ventures are led by teams rather than by individuals, any analysis seeking to explain firm level outcomes should assess the skills of the top management team rather than any one individual.³⁴

Self assessments of skills and abilities have been studied extensively in the industrial psychology literature where self-ratings are sometimes the only method of accessing individual difference data.³⁵ It has been concluded that self assessments can be at least as

²⁸ Jackson, Susan E., Randall S. Schuler, and Kaifeng Jiang. "An aspirational framework for strategic human resource management." *The Academy of Management Annals* 8, no. 1 (2014): 1-56.

²⁹ Hayton, "Strategic Human Capital Management in SMEs: an Empirical Study of Entrepreneurial Performance;" Pankaj C Patel, Jake G Messersmith, and David P Lepak, "Walking the Tight-Rope: an Assessment of the Relationship Between High Performance Work Systems and Organizational Ambidexterity," *The Academy of Management Journal* (July 19, 2012): 1–51.

³⁰ Hayton, "Strategic Human Capital Management in SMEs: an Empirical Study of Entrepreneurial Performance;" Sean A Way, "High Performance Work Systems and Intermediate Indicators of Firm Performance Within the US Small Business Sector," *Journal of Management* 28, no. 6 (November 24, 2002): 765–785; Messersmith and Guthrie, "High Performance Work Systems in Emergent Organizations: Implications for Firm Performance."

³¹ Paul A III Mabe and Stephen G West, "Validity of Self-Evaluation of Ability: a Review and Meta-Analysis," *Journal of Applied Psychology* 67, no. 3 (June 26, 1982): 280–96; Ted H Shore, Lynn M Shore, and George C III Thornton, "Construct Validity of Self- and Peer Evaluations of Performance Dimensions in an Assessment Center," *Journal of Applied Psychology* 77, no. 1 (September 10, 1992): 42–54.

³² Bloom et al., "Management Practices Across Firms and Countries." Wright et al., "Measurement Error in Research on Human Resources and Firm Performance: Additional Data and Suggestions for Future Research."

³³ Shore, Shore, and Thornton, "Construct Validity of Self- and Peer Evaluations of Performance Dimensions in an Assessment Center."

³⁴ Carmeli and Tishler, "The Relative Importance of the Top Management Team's Managerial Skills;" Michael D Ensley and Keith M Hmieleski, "A Comparative Study of New Venture Top Management Team Composition, Dynamics and Performance Between University-Based and Independent Start-Ups," *Research Policy* 34, no. 7 (September 2005): 1091–1105, doi:10.1016/j.respol.2005.05.008.

³⁵ Edward L Levine, "Introductory Remarks for the Symposium "Organizational Applications of Self-Appraisal and Self-Assessment: Another Look," *Personnel Psychology* 33 (June 10, 1980): 259–62; Edward L Levine, Abram III Flory, and

predictive of outcomes (e.g. job performance, achievement test scores, course grades) as other sources of information.³⁶

As noted by Mabe and West, “it would not be expected that ability evaluations would have a one-to-one correspondence with criterion measures that reflect not only ability but also (from the perspective of the individual being evaluated) other factors such as effort, task difficulty, and luck.” Thus, even while we may be critical of low correlations between self evaluations of performance and the ratings of others, there is no a priori reason to expect a perfect correlation between self-ratings of abilities and skills and those of others.³⁷

Among the factors influencing accuracy of self-ratings are the ability of the individual to accurately observe their own skills and behaviours, the ability to judge those skills, and the willingness to evaluate those skills. For example, Shore and colleagues³⁸ note that observability of performance dimensions increases the validity of self and peer assessments. Furthermore, it may be expected that the process of self-assessment might be influenced by the presence of incentives or inducements in the environment (e.g. the contingency of rewards). Thus assessments by self or peers are likely to be most biased when respondents feel that rewards are contingent upon the rating. On the other hand, in situations where there are no apparent reward contingencies, validity will be improved.

An important consideration is that individuals have unique access to knowledge about their skills, abilities and aptitudes.³⁹ For example, individuals have experience of their own actions and the effects of those actions, over many instances and in many situations. Individuals receive and process the judgments of others with respect to their abilities and numerous junctures in their work and non-work lives. Levine (p. 261) notes “we all have a good deal of time to verify, logically and rationally, our feelings about ourselves and our performance, because we have lived with ourselves ever since we can remember.”⁴⁰ This

Ronald A Ash, “Self-Assessment in Personnel Selection,” *Journal of Applied Psychology* 62, no. 4 (June 26, 1977): 428–35; Herbert G III Heneman, “Self-Assessment: a Critical Analysis,” *Personnel Psychology* 33 (June 10, 1980): 297–300; Mabe and West, “Validity of Self-Evaluation of Ability: a Review and Meta-Analysis;” J Sidney Shrauger and Timothy M Osberg, “The Relative Accuracy of Self-Predictions and Judgments by Others in Psychological Assessment,” *Psychological Bulletin* 90, no. 2 (February 2, 1981): 322–51; Timothy M Osberg and J Sidney Shrauger, “Self-Prediction: Exploring the Param Etersof Accuracy,” *Journal of Personality and Social Psychology* 51, no. 5 (September 25, 1986): 1044–57.

³⁶ Mabe and West, “Validity of Self-Evaluation of Ability: a Review and Meta-Analysis;” J Kevin Ford and Raymond A Noe, “Self-Assessed Training Needs: the Effects of Attitudes Toward Training, Managerial Level, and Function,” *Personnel Psychology* 40 (June 10, 2005): 39–53; Shrauger and Osberg, “The Relative Accuracy of Self-Predictions and Judgments by Others in Psychological Assessment;” Osberg and Shrauger, “Self-Prediction: Exploring the Param Etersof Accuracy.”

³⁷ Mabe and West, “Validity of Self-Evaluation of Ability: a Review and Meta-Analysis.”

³⁸ Shore, Shore, and Thornton, “Construct Validity of Self- and Peer Evaluations of Performance Dimensions in an Assessment Center.”

³⁹ Levine, “Introductory Remarks for the Symposium “Organizational Applications of Self-Appraisal and Self-Assessment: Another Look.”

⁴⁰ Levine, “Introductory Remarks for the Symposium “Organizational Applications of Self-Appraisal and Self-Assessment: Another Look.”

suggests that, considerations of self-representation bias aside, individuals have the most knowledge of their own skills.

Rating skills and abilities using a relative scale (i.e. in comparison with others) is more accurate than rating in absolute terms. The assurance of anonymity increases accuracy by reducing the bias of self-enhancement motivation. Experience with self-evaluations can enhance accuracy.⁴¹ According to Chandler and Jansen, self-ratings of skills are acceptable when a structured rating instrument is used; when the purpose is self-development rather than evaluation for promotion or reward; when skills are hard to observe; and when the scores are used for the purpose of understanding differences across skill dimensions.⁴²

While there is greater 'leniency' (inflation of ratings), self ratings also tend to be less prone to 'halo' bias than ratings by others.⁴³ This suggests that in detecting differences across a variety of skill dimensions, self-ratings may actually be more useful than ratings by others, despite a tendency towards inflation. Furthermore, if the degree of self-serving rating inflation is randomly distributed, then inflated ratings will not impact any observed association between typical skill levels, organisational practices and organisational performance outcomes, especially when the latter are derived from a second data source. In addition, positive self-evaluations may correlate with 'true' skill levels. In which case the association between skills and outcomes will be magnified rather than mitigated. In sum, to the extent that measures focus on observable behaviours, are framed as relative to others,⁴⁴ are presented in a format that reduces the motivation for self-serving responses, and which does not connect with rewards, then they are a scientifically valid approach to gathering M&L skills data.

Skills Frameworks and Measures

If it is legitimate and valid to measure skills by self-assessments, the next issue is which skills should be measured. As the review above suggests, there are numerous typologies of managerial and leadership skills.⁴⁵ However, there is a considerable degree of

⁴¹ Mabe and West, "Validity of Self-Evaluation of Ability: a Review and Meta-Analysis."

⁴² Chandler and Jansen. "The founder's self-assessed competence and venture performance."

⁴³ Ford and Noe, "Self-Assessed Training Needs: the Effects of Attitudes Toward Training, Managerial Level, and Function."

⁴⁴ F Shipper, "A Study of the Psychometric Properties of the Managerial Skill Scales of the Survey of Management Practices," *Educational and Psychological Measurement* 55, no. 3 (June 1, 1995): 468–79, doi:10.1177/0013164495055003014; Shipper and Davy, "A Model and Investigation of Managerial Skills, Employees' Attitudes, and Managerial Performance;" Shore, Shore, and Thornton, "Construct Validity of Self- and Peer Evaluations of Performance Dimensions in an Assessment Center."

⁴⁵ Peterson and Van Fleet, "The Ongoing Legacy of R.L. Katz: an Updated Typology of Management Skills;" Katz, "Skills of an Effective Administrator;" Pavett and Lau, "Managerial Work: the Influence of Hierarchical Level and Functional Specialty."

convergence around the core M&L skill set, and the need for additional considerations for leaders of SMEs.⁴⁶ Therefore, a skills measure needs to address the following categories:

- Technical skills
- Human/interpersonal skills
- Conceptual/organisational skills
- Entrepreneurial skills

There are a number of pre-existing measures, which may be adapted for the present objective. These measures have used a number of strategies to obtain skills data:

- Statements of *skill importance* reflect ratings of how important a given skill or list of skills is for the job.⁴⁷ This strategy is useful for understanding the nature or distribution of skills for a given job or role.⁴⁸ However, it may be less useful for understanding the level of skills currently available to organisations, as in the current research.
- *Self assessed skills* are particularly appropriate where few others have an opportunity to observe, such as in micro enterprises.⁴⁹
- Self reports of *training needs*.⁵⁰ This approach has an advantage in that it may de-emphasize the need for self-serving bias, and allows a developmental rather than evaluative orientation, which may enhance validity of responses. However, as with skill importance it does not directly provide insights into current skill availability.
- *Assessments of the skills of others*⁵¹ have the advantage that others, especially peers, have the opportunity to observe skills in action.⁵² Extensive evidence suggests that peer evaluations of skills can be among the most valid approach to measuring capabilities⁵³.

⁴⁶ Peterson and Van Fleet, "The Ongoing Legacy of R.L. Katz: an Updated Typology of Management Skills;" Carmeli and Tishler, "The Relative Importance of the Top Management Team's Managerial Skills;" Chandler and Jansen, "The Founder's Self-Assessed Competence and Venture Performance."

⁴⁷ Mumford, Campion, and Morgeson, "The Leadership Skills Strataplex: Leadership Skill Requirements Across Organizational Levels."

⁴⁸ Pavett and Lau, "Managerial Work: the Influence of Hierarchical Level and Functional Specialty."

⁴⁹ Chandler and Jansen, "The Founder's Self-Assessed Competence and Venture Performance."

⁵⁰ Ford and Noe, "Self-Assessed Training Needs: the Effects of Attitudes Toward Training, Managerial Level, and Function."

⁵¹ Shipper and Davy, "A Model and Investigation of Managerial Skills, Employees' Attitudes, and Managerial Performance;" Shipper, "A Study of the Psychometric Properties of the Managerial Skill Scales of the Survey of Management Practices."

⁵² Shore, Shore, and Thornton, "Construct Validity of Self- and Peer Evaluations of Performance Dimensions in an Assessment Center."

⁵³ Mabe and West, "Validity of Self-Evaluation of Ability: a Review and Meta-Analysis;" Shipper, "A Study of the Psychometric Properties of the Managerial Skill Scales of the Survey of Management Practices."

In the current context, we measure skills of the individual CEO/Managing Director, or top management team where there is more than one top manager. These skills are assessed using self-reports for sole top managers, and reports on the skills of the whole team where there is a team rather than individual. The dimensions of skills included are leadership, entrepreneurial, organisational and technical. The measures are framed as relative to others. This approach has a number of benefits:

- Self-reports allow comparison of self assessed skills across firms with a single top manager, and obtain an understanding of how/if these differ systematically across size categories, sectors or ownership structure.
- Ratings of management team skills reduce the influence of self-serving bias in ratings.
- Framing questions in a relative fashion (in comparison to others), further reduces self-serving bias.

In the next section we describe the sampling strategy and measures to be used to operationalise all of the variables in the study.

Methodology

Sample

The theoretical population for this study is all SMEs with between 5 and 250 employees in England. The sampling frame was the Inter-Departmental Business Register (IDBR). We excluded from the sampling frame units of multi-site workplaces with a total of more than 250 employees, and subsidiaries of domestic or international businesses.

In order to increase our confidence in the validity of responses, we obtained second responses to the same survey from a sub-sample of 500 organisations. These second responses allow us to directly assess the reliability our measures of management team and organisational characteristics.

The sample was drawn using a non-proportional stratified random probability approach, stratifying by employee number and industry sector. We oversample enterprises with more than 50 employees in order ensure sufficient number of responses in strata that form only a small proportion of the population.

Five firm size bands were defined according to the number of employees: 5-9, 10-19, 20-49, 50-99, 100-250. We sought approximately equal numbers of firms across these bands, although as described below, it proved more difficult to obtain responses from firms in the two largest bands.

In terms of industry sectors, given the importance of manufacturing, we oversampled this sector, while still maintaining breadth and representativeness. Industry sectors were organised as follows:

- A & B (Agriculture; Forestry & Fishing + Mining and Quarrying)
- C (Manufacturing)
- D&E (Electricity, Gas, Water supply etc)
- F (construction)
- G (Wholesale & Retail)
- I (Accommodation & Food Services)
- H&J (Transportation, Storage, Communications)
- K (Financial & insurance)
- L,M,N (Real estate, Professional Services)
- P&Q (Education and Health)
- R&S (Arts and Recreation)

The target respondent was the chief executive officer in the organisation. Prior to contacting by telephone, letters of introduction outlining the project were sent to firms with 20+ employees. Respondents were asked if there are other members of the top management team. If a team rather than an individual runs the organisation, respondents were invited to commit to a survey of a second member of the top management team, and to provide contact information for that individual.

Variables and Measures

The contents of the questionnaire are reported in Appendix A. There are two forms of questionnaire. The first applies to single managers. The second applies to members of management teams.

Characteristics of management (Q1-Q2): The introductory measures in the questionnaire determine whether the respondent is a founder, or not, and also the age of the business. The second question clarifies whether an individual or team are responsible for management. The definition of membership in the top management team is founded on the fulfilment of two out of three criteria (ownership of a 10% share in the equity of the business; active engagement in strategic direction; active engagement in strategic implementation). This definition is currently used in research on top management teams and new venture teams⁵⁴. The significance of using two out of three criteria is that it does not restrict the definition to that of ownership, allowing the possibility that non-owners may be significantly involved in managing and influencing the direction of the business. This definition also requires active engagement in the business, thus excluding purely investors and silent partners who otherwise exert no direct influence on management and strategy from consideration.

Education (Q3-Q4): We measure education primarily using the scale included in the Small Business Survey, with additional items to determine specific types of higher education pursued.

⁵⁴ A C Klotz et al., "New Venture Teams: a Review of the Literature and Roadmap for Future Research," *Journal of Management* (June 26, 2013), doi:10.1177/0149206313493325; Michael D Ensley and Keith M Hmieleski, "A Comparative Study of New Venture Top Management Team Composition, Dynamics and Performance Between University-Based and Independent Start-Ups," *Research Policy* 34, no. 7 (September 2005): 1091–1105, doi:10.1016/j.respol.2005.05.008.

Experience (Q5-Q8): This construct is measured with items regarding years of business ownership, management and international experience.

Family firm (Q9): As family ownership is known to be associated with the rate of adoption of professional management and management practices we include this measure as a potential control variable. Categorisation of family firms depends upon positive answers to two out of three questions. First, does the respondent consider it to be a family firm, defined in terms of majority ownership by a family? Second, are there multiple members of the family involved in day-to-day management? Third, is the future Chief Executive Officer or Managing Director a member of the owning family?

Growth Attitudes (Q10): Two questions are used to identify attitudes towards growth by asking about reactions to an increase in the number of employees of 25% and 100% respectively.

Leadership and Management Skills (Q11): These items collectively address the four dimensions of L&M skills (technical, human, conceptual, entrepreneurial) identified in our literature review. The measures are adapted from Chandler and Jansen⁵⁵. For single managers the referent is their own skills. For members of teams the referent is the top management team. Preliminary analysis checked the measurement properties of the scales.

Consistent with a priori expectations, an exploratory factor analysis of the L&M skills measure established that a four factor solution best represented the data. The four factors were labelled 'Entrepreneurial Skills,' 'Leadership Skills,' 'Organisational Skills,' and 'Technical Skills.' The individual items were therefore averaged to create a score on each dimension for each respondent. These subscale scores reflect estimates of either the skill levels of the individual in the case of the solo managers, or the skill levels of the management team in the case the respondent was a part of a team.

Human Resource Management practices (Q12-14): These items are adapted from Messersmith and Guthrie⁵⁶ who in turn have adapted them from extensive prior research into HRM systems going back as far as Huselid⁵⁷. This reduced set of items reflects all major elements of the HRM system that are known to be associated with firm performance⁵⁸, including staffing, training, compensation, performance management, information sharing and participation in decision making. We treat our measure of HR

⁵⁵ Chandler and Jansen, "The founder's self-assessed competence and venture performance."

⁵⁶ Messersmith and Guthrie, "High Performance Work Systems in Emergent Organizations: Implications for Firm Performance."

⁵⁷ Huselid, Mark A. "The impact of human resource management practices on turnover, productivity, and corporate financial performance." *Academy of management journal* 38, no. 3 (1995): 635-672.

⁵⁸ Combs, Liu, and Hall, "How Much Do High-Performance Work Practices Matter? a Meta-Analysis of Their Effects on Organizational Performance."

systems as a formative index⁵⁹. Since the individual items are assessed as percentages of employees receiving a particular HR practice, we first calculated the z-scores for each item. We then created an overall index for HRM by taking the average of the item scores⁶⁰.

Strategic Management Practices (Q16-Q17): These items capture the dimensions of strategy formation and strategic management identified in prior research⁶¹. A principal components analysis of these items identified a three factor solution. We constructed three variables based upon the mean of the scale scores, labelled Centralised, Formalised, and Responsive. These three variables reflect three distinct qualities of the strategy formulation process and are treated as reflective indicators.

Turnover (source IDBR) in the most recent year of data (2013). Because this measure is not normally distributed it was log-transformed.

Productivity (source IDBR) was estimated as the (log transformed) ratio of 2013 turnover to employees.

Growth was measured as the growth in employment from 2011 to 2013 using employment data from the IDBR.

Additional controls for company age and industry were obtained from the IDBR database.

Survey Implementation

The questionnaire was assessed through ten cognitive interviews to evaluate the comprehensibility of the interview questions and check the quality of responses. A pilot test of the instrument was then conducted using a sample of 50 firms (from across the sampling criteria). In the main data collection phase, interviews were conducted by TNS/BMRB using computer assisted telephone interviewing (CATI). By design, telephone interviews lasted approximately 20 minutes or less to avoid respondent fatigue and still enable the collection of all relevant data.

Achieved Sample

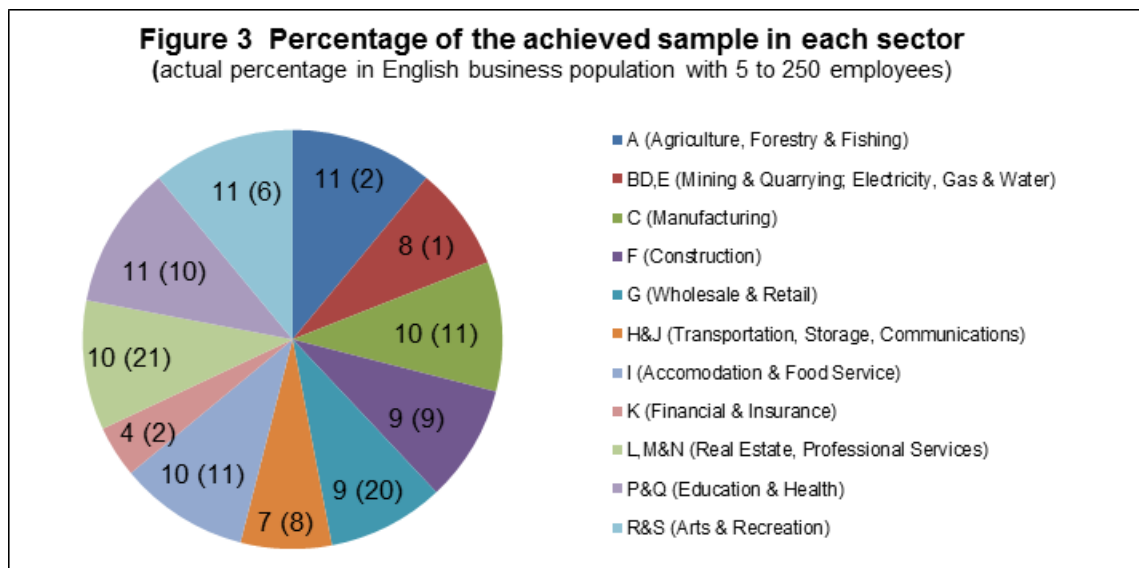
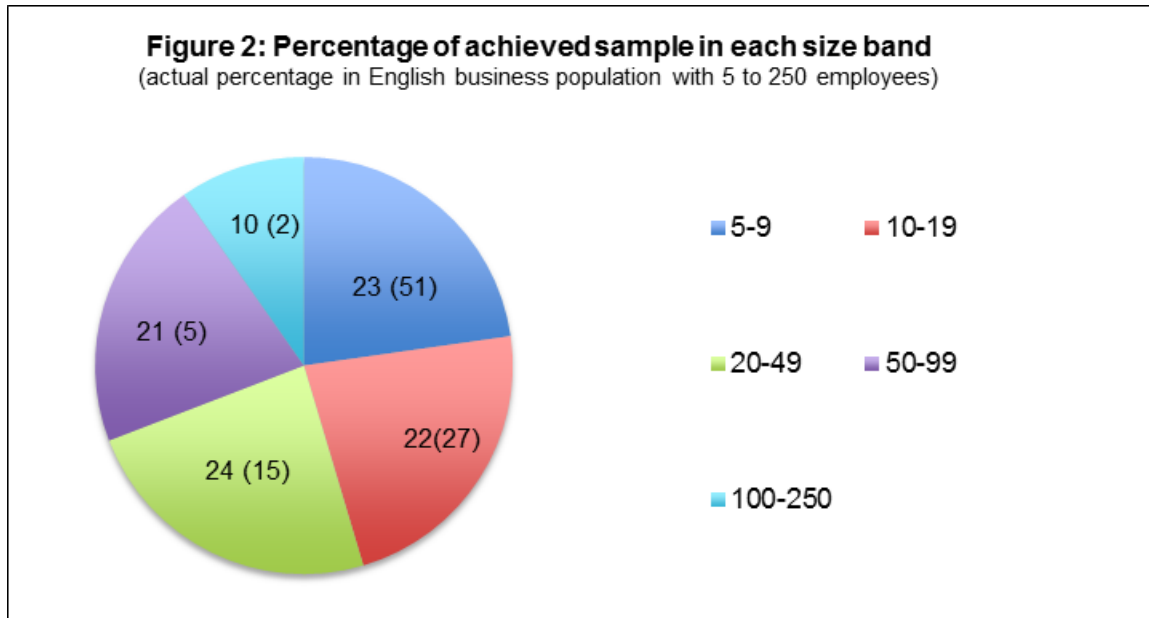
A total of 2,948 interviews were conducted in England. These included 371 interviews with a second senior manager in businesses that had a 'senior management team'. (A further

⁵⁹ Jiang, Kaifeng, David P. Lepak, Kyongji Han, Ying Hong, Andrea Kim, and Anne-Laure Winkler. "Clarifying the construct of human resource systems: Relating human resource management to employee performance." *Human Resource Management Review* 22, no. 2 (2012): 73-85; MacKenzie, Scott B., Philip M. Podsakoff, and Cheryl Burke Jarvis. "The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions." *Journal of Applied Psychology* 90, no. 4 (2005): 710.

⁶⁰ Huselid, Mark A. "The impact of human resource management practices on turnover, productivity, and corporate financial performance;" Jiang, Kaifeng, David P. Lepak, Kyongji Han, Ying Hong, Andrea Kim, and Anne-Laure Winkler. "Clarifying the construct of human resource systems: Relating human resource management to employee performance."

⁶¹ Hart and Banbury, "How Strategy-Making Processes Can Make a Difference."

934 interviews were conducted in Northern Ireland and Scotland but these data are not included in this report). Our achieved sample included approximately equal numbers of respondents from five size-bands (5-9, 10-19, 20-49, 50-99, 100-250 employees) and 11 industry groupings⁶² (Figures 2 and 3).



⁶² A & B (Agriculture; Forestry & Fishing + Mining and Quarrying)
 C (Manufacturing)
 D&E (Electricity, Gas, Water supply etc)
 F (construction)
 G (Wholesale & Retail)
 I (Accommodation & Food Services)
 H&J (Transportation, Storage, Communications)
 K (Financial & insurance)
 L,M,N (Real estate, Professional Services)
 P&Q (Education and Health)
 R&S (Arts and Recreation)

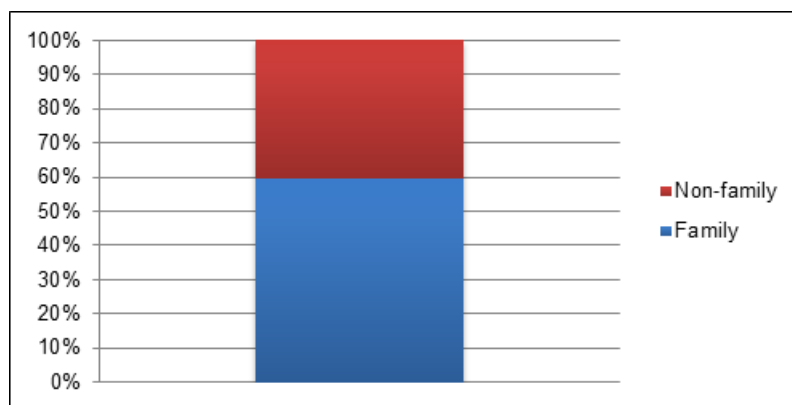
Age distribution of respondent firms - Firms in the sample were of wide ranging ages. The earliest was founded 1900, and the newest were founded 2013. The median founding year was 1998, and the modal year was 2002.

Family ownership - Family ownership is important because of the extensive evidence that family owned firms tend to lag behind non-family firms in terms of the use of best management practices. Accordingly, we established whether respondent firms were family owned. The criteria used to categorise respondents as family or non-family owned businesses is that the respondent must self-identify as a family firm, and then answer affirmatively either that one or more family member is in the management team or that a family member is expected to be the successor to the CEO. Approximately 60 per cent of respondents indicated that they were family firms (Figure 4). This compares to an estimate of 62 per cent in the 2012 Small Business Survey.

It was found that 1,731 firms (68.2%) self identify as a family business. A cross check reveals that of these, 1,700 have one or more family member involved in managing the business and 1,040 expect the successor of the current CEO/MD to be a family member. If family firm is defined as an affirmative answer to the first, followed by either a value greater than one for family members in management, or a family member as successor, then 1,540 (59.8%) firms qualify. A more conservative estimate of the number of family businesses would include all three criteria, and results in just 1,031 firms (40%) being classified as family enterprises.

Figure 4: Proportion of Family Firms

Criterion: Self-identify as family firms, and either one or more family member is in the management team, or a family member is expected to be the successor to the CEO



Attitudes to growth - Respondents were asked about their attitudes to growth. Specifically whether a 25 per cent increase in the number of employees would be viewed as positive, negative or neutral. They were then asked whether a 100 per cent increase would be positive, negative or neutral. Growth was not universally viewed as desirable. Nearly 20 per cent of respondents did not view any growth as positive, and nearly 40 per cent did not view high growth (100 per cent) as positive. Nevertheless, there were generally positive attitudes towards growth.

Additional management and firm demographics

Founders - 244 out of 404 (60.4%) solo managers were founders of their business. 899 out of 2173 (41.4%) of managers in teams were founders.

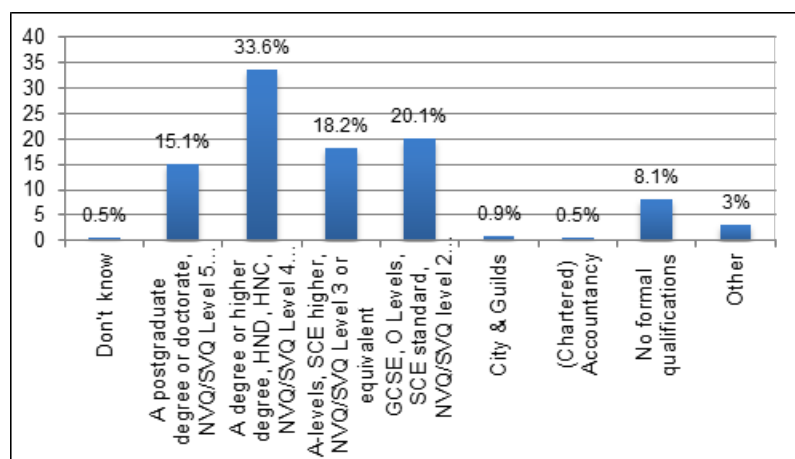
Company Age - The median founding year was 1998, while the modal founding year was 2002. The range of founding years in this sample was from 1900 to 2013.

Company Tenure - The mean number of years tenure with the company is 14 years with a maximum of 65 years.⁶³

Management Team Size - 84.3 percent of SMEs are run by more than one top manager. Mean 2.89; Median 2; Range 1-47.

Educational attainment - Data on the highest level of education indicates the highest proportion of top managers in the survey possessed a first degree or equivalent (figure 5). For all degree holders, the most commonly studied area of the highest degree held was Business, Finance and Law (42.7%).

Figure 5: Highest educational attainment



Experience – several measures of experience capture industry experience, entrepreneurial/business ownership experience, and international experience. Each of these were included in later analyses as indicators of human capital accumulated through direct experience.

- Mean years experience in current industry: 23.01
- Mean years of entrepreneurial experience: 14.8
- Mean years experience total: 31.0
- Mean number of businesses owned: 1.6
- Median year of founding first business: 1995

⁶³ This variable was one for which there is a significant degree of missing data.

International experience: 657 (25.5%) have worked outside of UK, 702 (27.2%) have experience selling outside the UK. Combining the two measures, 743 (28.8%) have at least some international experience and 308 (12.0%) report possessing both types of experience.

Findings

Skills and Management Practices

A central reason why L&M skills are of interest is because of their expected association with the implementation of effective management practices. Since we are examining a wide range of firm sizes, ages and in particular, industry sectors, it was necessary to focus on generic (but essential) practices – in this case, strategic management and HRM. To examine these relationships empirically we conducted both hierarchical regression analyses and structural equations modelling. Hierarchical regression analysis reveals the direct associations among the independent variables (skills and practices) and the dependent variables (turnover, productivity and growth). Structural equations models (SEM) facilitate the examination of simultaneous relationships among of multiple independent variables and multiple dependent variables. SEM also allows us to test indirect relationships such as the hypothesised mediating role of management practices between skills and performance outcomes. The results of the preliminary analysis, and both sets of analyses are reproduced in full in Appendices B (Reliability Analysis) C (Regression Models) and D (Structural Models).

Preliminary Analysis

As a first step in the analysis, we examined the measurement properties of the scales used. Table 1 in Appendix B summarises our results for each variable under study. We used exploratory factor analysis to check the factor structure of the measures. Following confirmation that the measures resulted in the expected number of factors (i.e. four dimensions for skills, three dimensions for strategic management practices) we estimated the internal consistency reliability using Cronbach's coefficient alpha. In general, all scales exceeded the desirable threshold of .70. The estimate of .67 for the internal consistency of the HRM items is unproblematic given that this scale should be treated as a formative rather than a reflective scale (and therefore items do not necessarily correlate strongly with one another). The only case where there is a cause for concern is the strategy centralisation measure, which resulted in a low coefficient alpha of .561 (for solo managers) and .505 (for managers in teams). Any results involving this measure should be interpreted with some caution due to the relatively high level of measurement error. All other measures are acceptable or better in terms of this metric.

A second reliability concern, especially when measuring perceptions of an object or organisation, is the extent to which two different raters agree in their assessment. For 500 of the responding firms, we obtained a second response in order to check the interrater reliability of the central variables of skills and practices. The results, summarised in Appendix B suggest the following conclusions:

- There is a statistically significant correlation between the ratings given by the pairs of respondents on all dimensions being measured.

- The level of interrater reliability is at an acceptable, but moderate level⁶⁴.
- Rater agreement increases with the objectivity of the rating target. For example, contrast the relatively high interrater agreement with respect to observable HRM practices with the lower level of agreement on evaluations of organisational skills.
- There remains a significant degree of measurement error that may be attributed to differences in raters (i.e. different raters provide different scores on the same rating target) and which can either positively or negatively influence the estimated relationships among the variables in this study.

Descriptive Findings

In this section we report the descriptive data on the three performance metrics included in the analysis (turnover, employment growth and productivity) and compare them across the five firm-size categories. We identify differences that are statistically significant. We then present the data describing the distribution of L&M skills and the use of management best practices amongst the surveyed businesses. In the final section of this chapter, we outline the associations found between L&M skills, best practices, and performance outcomes.

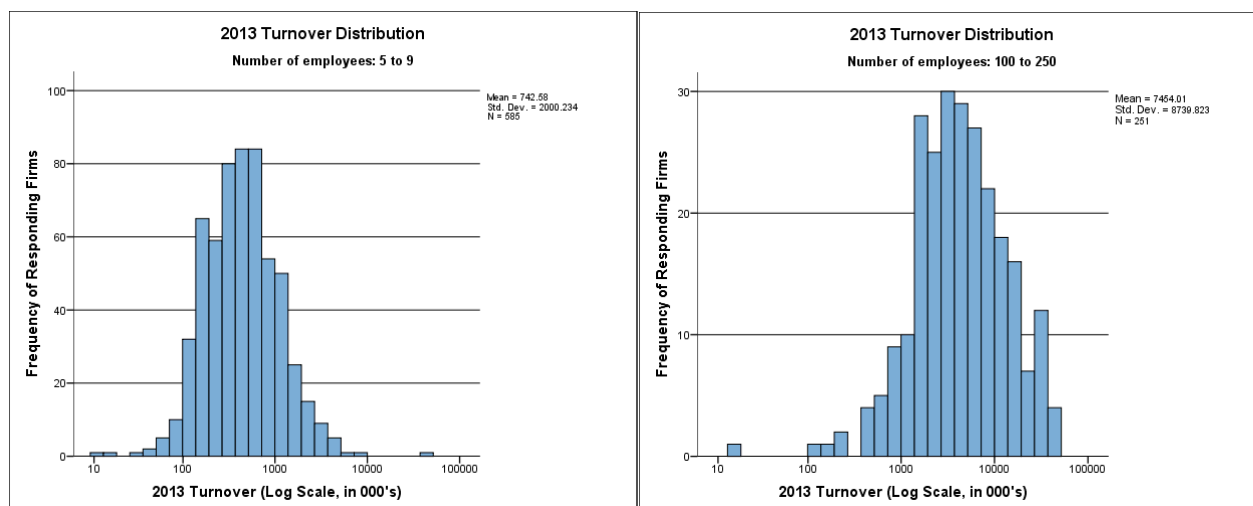
Distribution of Performance across Size Categories

We measured performance on three metrics: turnover, productivity and growth. These data were obtained from the Inter Departmental Business Register (IDBR).

Turnover (£'000s 2013): As would be expected, turnover is higher with each size category. The difference across size bands is statistically significant. The distribution of turnover naturally tends to be skewed strongly to the lower end of the scale. If plotted on a linear scale the values tend to cluster towards the left of the scale with a tail of the small proportion of firms that perform above the average. We present the distributions using a log scale on the X-axis in order to show more clearly the mean and variation of the distribution around the mean. To illustrate, in figure 6 below we show the distribution for firms with between 5 and 9 employees, and between 100 and 250 employees.

⁶⁴ A challenge with assessing interrater reliability on perceptions of organisational variables is identifying an objective minimum standard for acceptability (James, Lawrence R., Robert G. Demaree, and Gerrit Wolf. "Estimating within-group interrater reliability with and without response bias." *Journal of applied psychology* 69, no. 1 (1984): 85; Lance, Charles E., Marcus M. Butts, and Lawrence C. Michels. "The Sources of Four Commonly Reported Cutoff Criteria What Did They Really Say?." *Organizational Research Methods* 9, no. 2 (2006): 202-220). Given the absence of a concrete criterion, an alternative is to compare with extant research. One review of studies of multi-rater evaluations of organisational climate suggests a typical range for interrater agreement measured as ICC(1,1) is from .00 to .50 with a median of .12 (James, Lawrence R. "Aggregation bias in estimates of perceptual agreement." *Journal of applied psychology* 67, no. 2 (1982): 219). There have been several studies comparing interrater reliability in the perception of HRM measures, ICC (1,1) for the scale of between .06 .29 and ICC(1,k) of .11 and .52 (e.g., Wright, Patrick M., Timothy M. Gardner, Lisa M. Moynihan, Hyeon Jeong Park, Barry Gerhart, and John E. Delery. "Measurement error in research on human resources and firm performance: Additional data and suggestions for future research." *Personnel Psychology* 54, no. 4 (2001): 875-901). Larger ICC's are possible when a larger number of raters are used (Bliese, Paul D. "Group size, ICC values, and group-level correlations: A simulation." *Organizational Research Methods* 1, no. 4 (1998): 355-373; see also Wright, et al., 2001). Meta analytic evidence suggests an average reliability for peer ratings of job performance of .42 (Viswesvaran, Chockalingam, Deniz S. Ones, and Frank L. Schmidt. "Comparative analysis of the reliability of job performance ratings." *Journal of Applied Psychology* 81, no. 5 (1996): 557). The results of the present study therefore suggest a level of interrater agreement comparable with extant research.

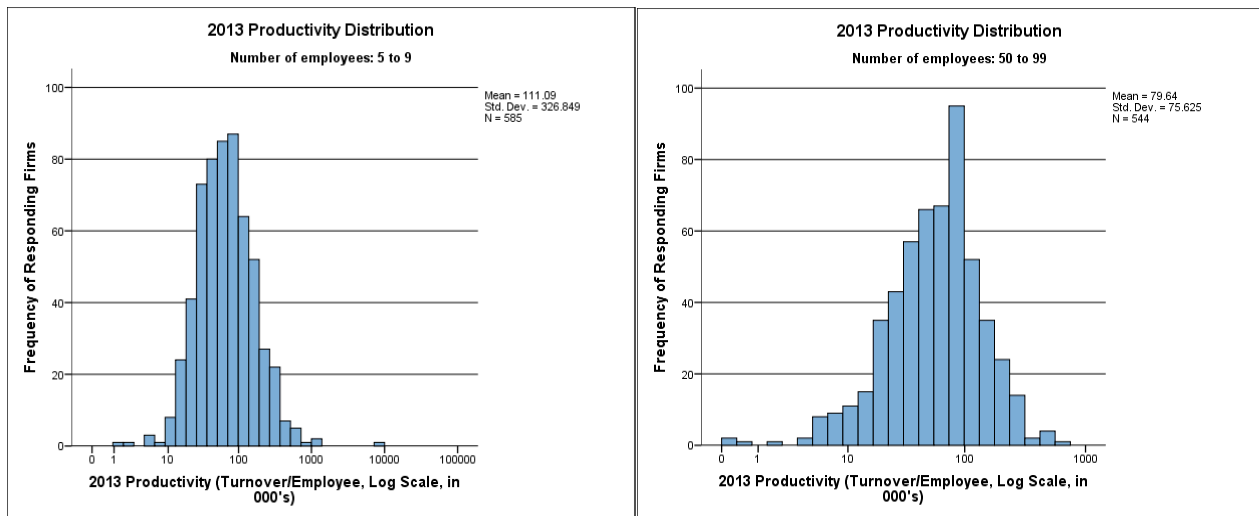
Figure 6: Distribution of Turnover by Firm Size



Productivity (Revenues per employee, £000s 2013): It is generally recognised that revenues per employee increase as firms become larger. This is typically based on comparisons of firms across the entire population. However, in this sample we have only examined SMEs. In this data, we find that productivity is lower in the two largest size categories than the smallest. Furthermore these are statistically significant differences⁶⁵. Figure 7 illustrates the distribution of productivity in two size categories (5-9 employees and 50-99 employees). As with turnover, we present the data on a logarithmic scale on the x-axis to more clearly show the mean and variation of the distribution. If these data were depicted using a linear scale the productivity figures would be skewed towards the left end of the scale with a long tail representing a small number of high performers in terms of superior productivity.

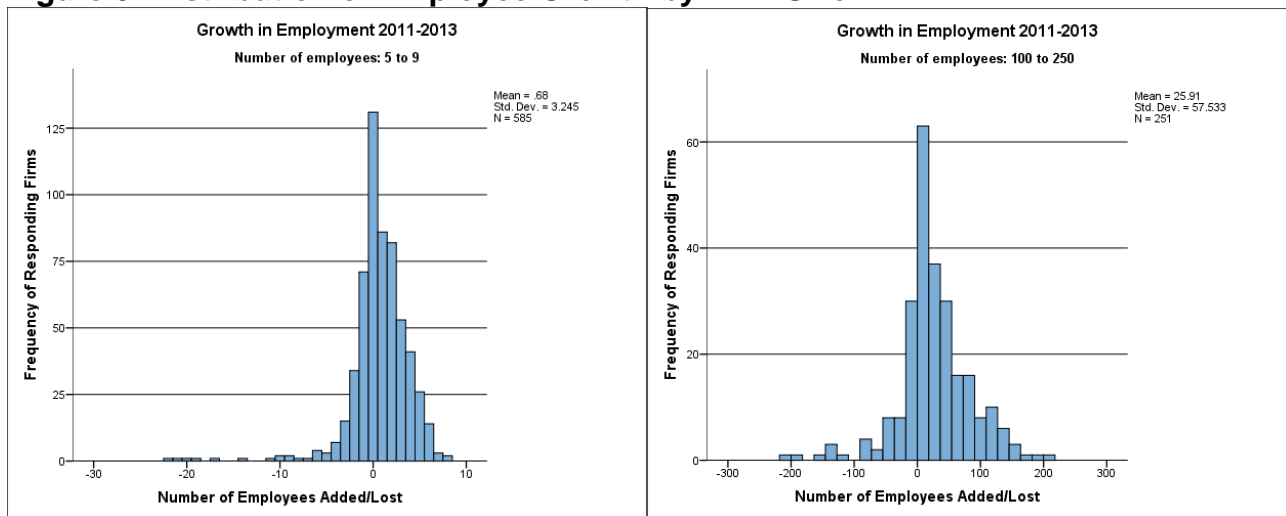
⁶⁵ It is possible that these differences are a result of sampling strategy. The first stage of the sampling frame was the IDBR, but the selected firms were cross-checked for their presence in the Fame database to allow cross validation of some measures. Furthermore, the sample is not proportional, but is stratified to obtain a sufficiently large number of responses in each size category. This non-proportional sampling strategy may therefore overstate the difference in productivity by increasing the relative number of firms in larger categories – and thus the statistical power of any comparisons. However, we do observe a statistically significant, negative correlation between turnover and firm size (number of employees) across the sample.

Figure 7: Distribution of Productivity by Firm Size



Growth: We measured growth in terms of the change in number of employees from 2011-2013 (number of jobs added). As would be expected, growth by this measure is higher in the largest group of firms compared with the smaller firms. There is a statistically significant difference between size bands. There is also increased variation in the number of jobs added/lost in larger firms versus smaller (figure 8).

Figure 8: Distribution of Employee Growth by Firm Size



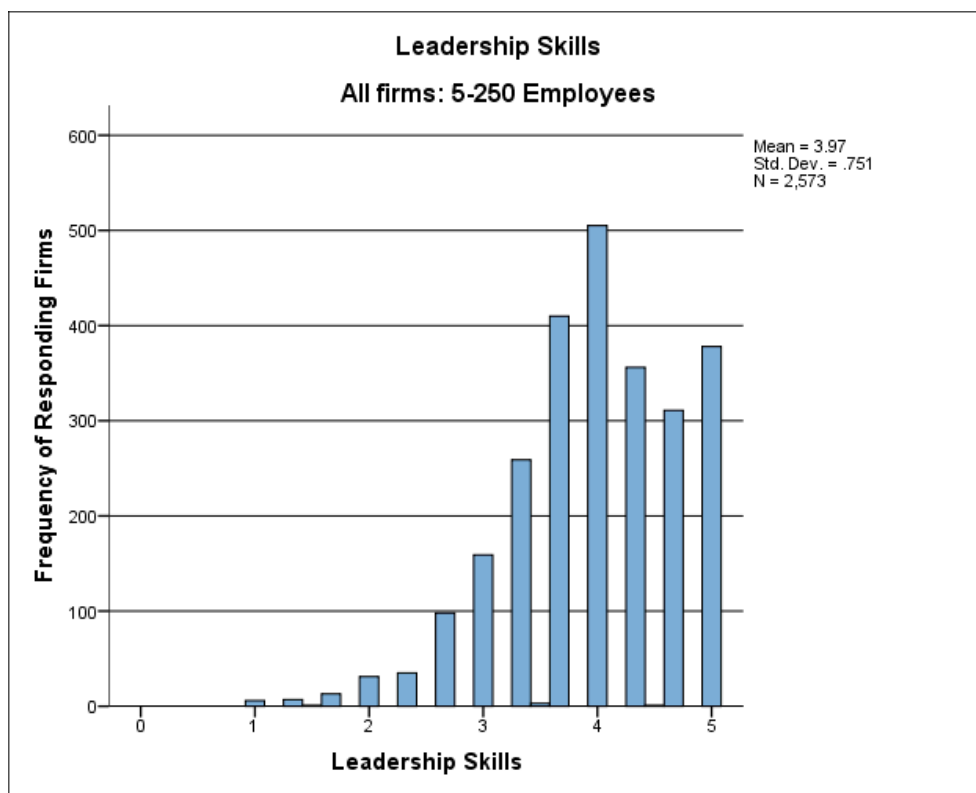
Distribution of Skills across Size Categories

Skills were measured using self-reported scores for a range of statements (items) relating to each skill dimension. For each statement, respondents scored themselves using a five-point scale ranging from 1='strongly disagree' to 5='strongly agree'. We then established that there was a high correlation among pairs of items representing the same dimension (and a significantly lower correlation between pairs of items representing different dimensions). When we were satisfied with the validity of the items for each dimension, we created an overall score for each skill using the mean of the responses to the relevant items. This means that skills ratings for each skill-set are described on a five-point scale ranging from a minimum of 1 to a maximum of 5. Higher scores represent higher

subjective evaluations of skills on each dimension. We can interpret a score of 1 as very bad, 2 as bad, 3 as neutral, 4 as good, and 5 as very good. Thus ratings of 4 and above are desirable.

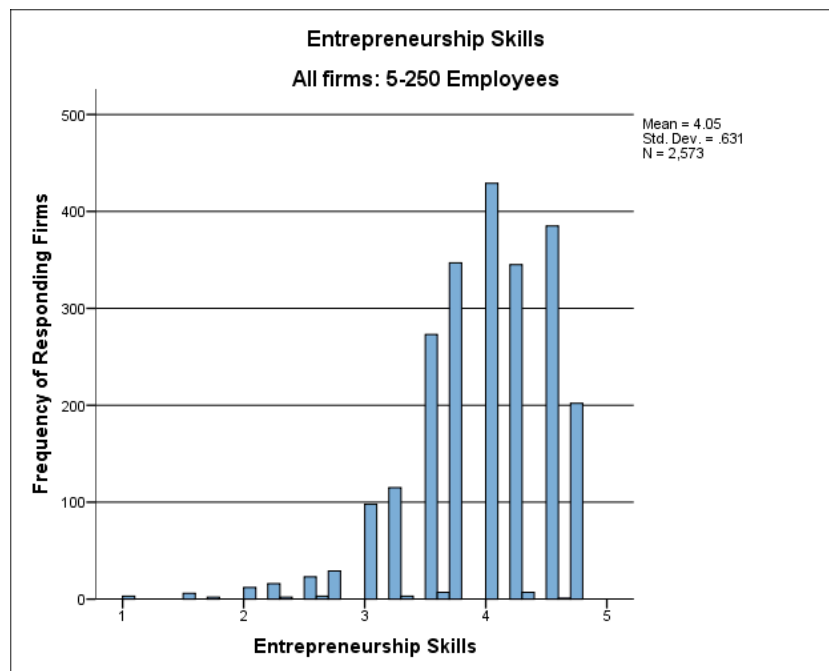
Leadership skills: There are no statistically significant differences between size categories in terms of leadership skills. The mean value of close to 4 out of a possible 5 suggests a relatively high self-evaluation across the board (equivalent to a rating of 'good'). However, there is also a good degree of variation among respondents. There is a notable 'long tail' of firms, with some rating themselves as low as 1 (equivalent to a rating of 'very bad'). Only half of the firms in the sample fall above the desirable level of 'good'. This distribution is illustrated graphically in Figure 9 for all firms in the sample.

Figure 9: Distribution of Leadership Skills



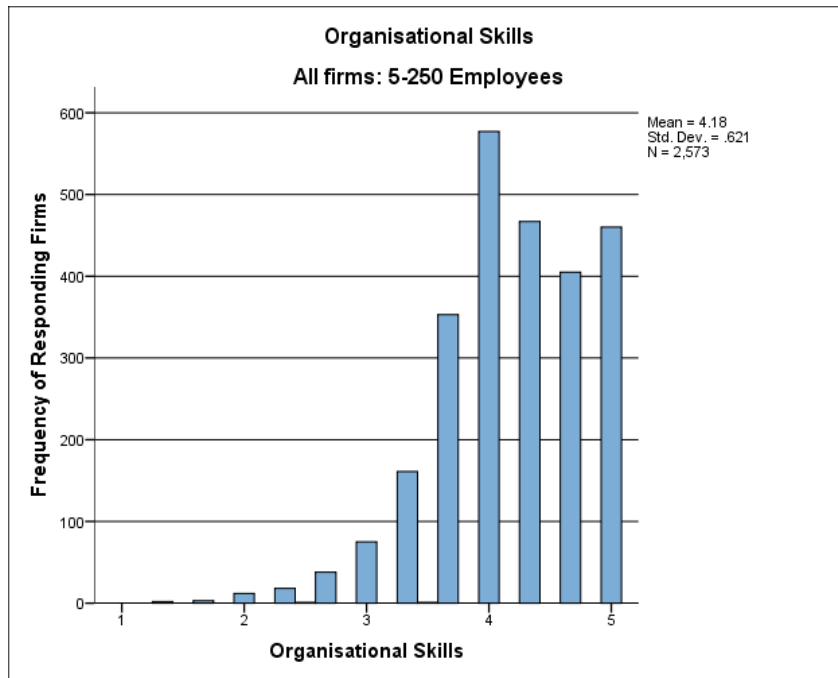
Entrepreneurship skills: There are no statistically significant differences between size categories in terms of entrepreneurship skills. As with leadership, the mean value is around 4 out of 5, with slightly less variation among respondents in their self-evaluations than for leadership skills. Again, we observe that half of the firms in the sample fall below the desired level of 'good' on entrepreneurship skills. Figure 10 illustrates the distribution for all firms in the sample.

Figure 10: Distribution of Entrepreneurship Skills



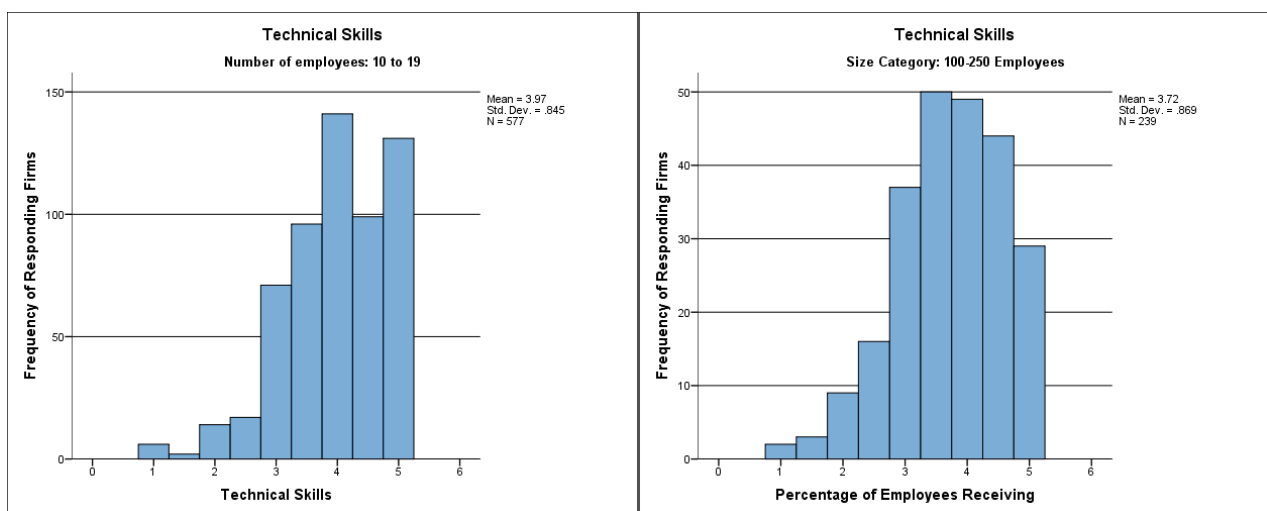
Organisational skills: There are no statistically significant differences between size bands in terms of organisational skills. Respondents tended to rate this skill set most highly of the four skill dimensions, with a mean value of close to 4.2 out of 5, and with a moderate degree of variation across individuals. Even so, we observe a substantial proportion of firms falling below the level of ‘good’ on this scale. Figure 11 illustrates this with the distribution of organisational skills across all firms in the sample.

Figure 11: Distribution of Organisational Skills



Technical skills: Large firms (100-250 employees) report significantly lower technical skills than smaller firms (5-49 employees). This is illustrated graphically in the distributions in Figure 12. Overall, this was the skill set receiving the lowest average ratings, but also with the highest degree of variation across respondents as shown in the standard deviation values. A substantial portion of firms, more than fifty per cent, rate themselves below the level we interpret as ‘good’.

Figure 12: Technical Skills by Firm Size



Conclusion: There is no discernible difference in self-reported skills levels across size categories. However, even after accounting for the inevitable inflation of self-reported skill levels, we find a significant degree of variation across respondents with clear evidence of a long tail of firms reporting below average levels of skills in each dimension. Comparison of ratings by two respondents from the same firms confirms agreement on the ratings of management team skills. In a later section, we evaluate whether this variation in self-

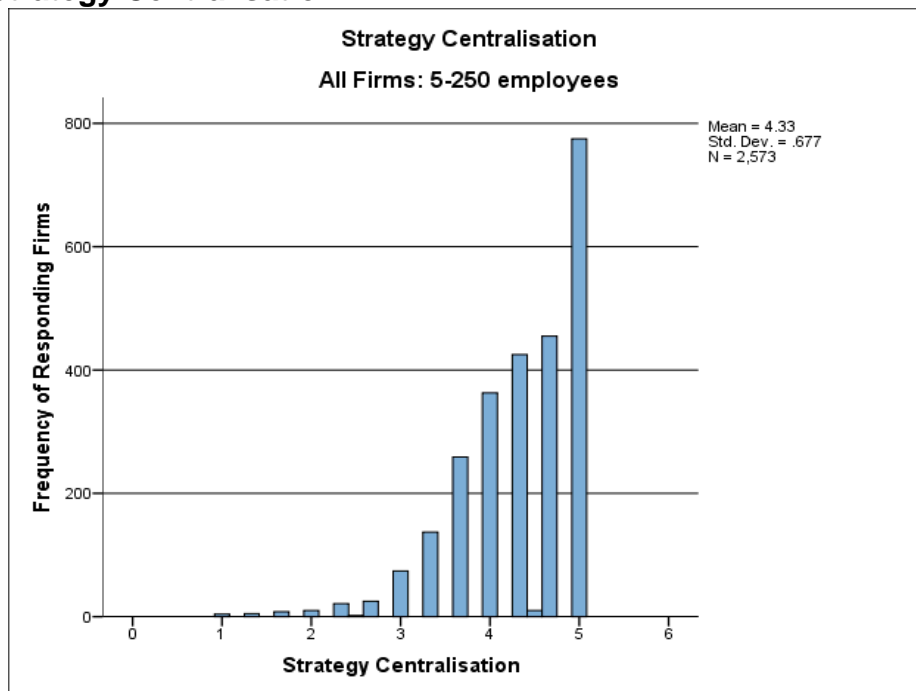
reported skill levels is associated with the long tail of performance. In the next section, we report the distribution of management practices.

Distribution of Management Practices across Size Categories

Management practices were measured using a subjective rating instrument with multiple items representing each dimension of practices. As with skills, measures of strategic management practices were assessed using a five-point response scale ranging from 1='strongly disagree' to 5='strongly agree'. We created an overall score for each of the three dimensions of strategic management practice using the mean of the responses to the relevant items. This means that strategic management practices are described on a five-point scale ranging from a minimum of 1 to a maximum of 5. Higher scores represent stronger agreement on each dimension such that a value of five means that the respondents strongly agree that their strategy can be described as centralised, or formalised, or responsive. A value of three reflects a neutral (neither agree-nor disagree) and a value of 1 reflects a strong disagreement – i.e. the item is definitely not descriptive of that organisation.

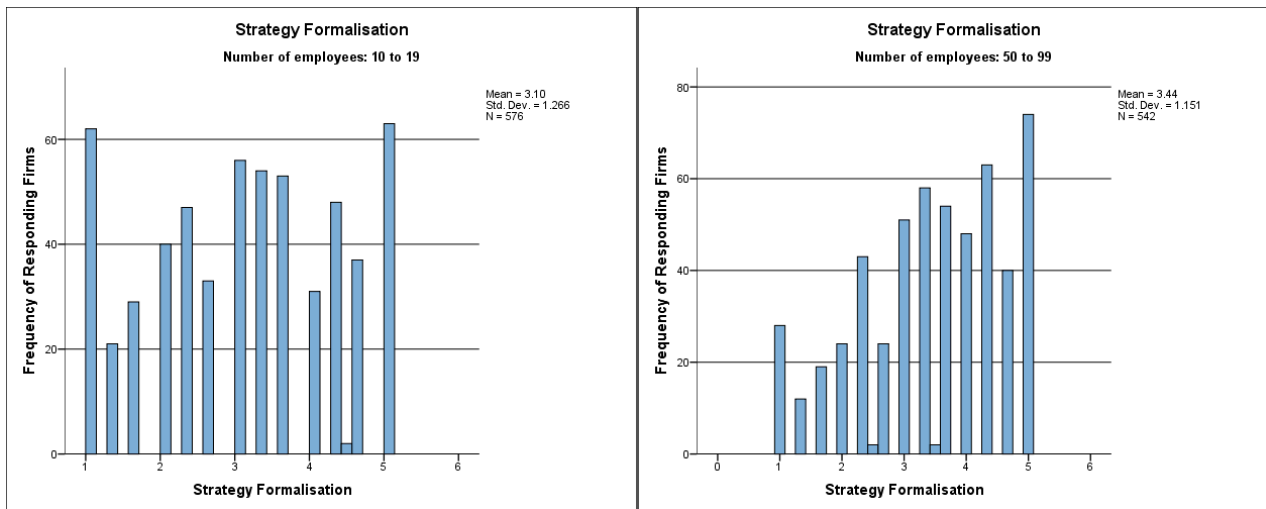
Strategy Centralisation: There are no differences across size categories in terms of the centralisation of strategy. In all SMEs in this dataset, there was a clear tendency towards centralisation of strategy formulation. Nevertheless, there is a meaningful portion of firms that report neutral or even lower ratings on this dimension of practice.

Figure 13: Strategy Centralisation



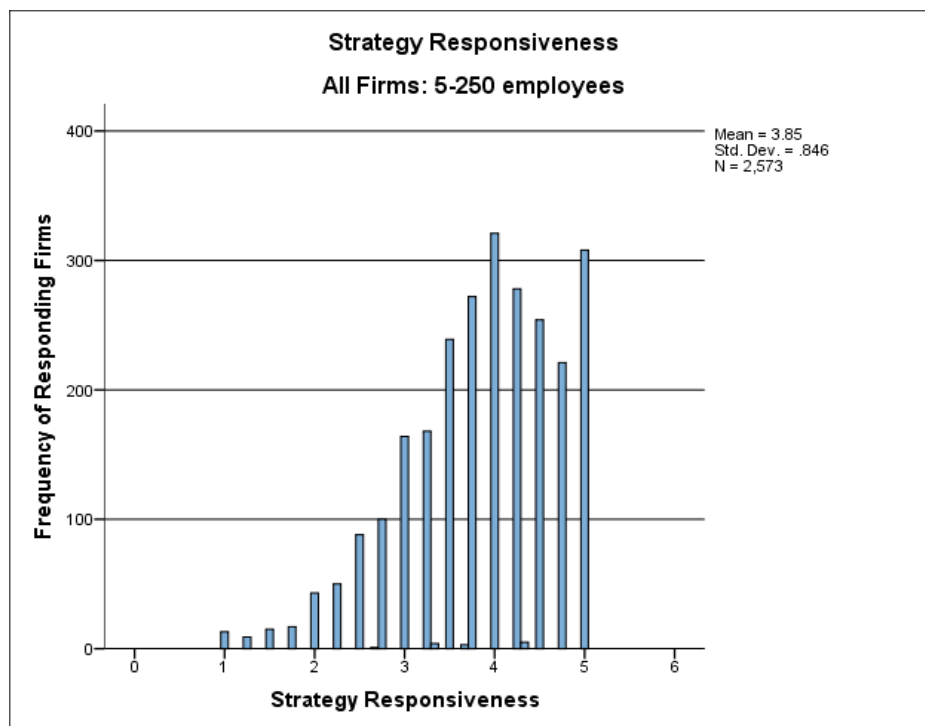
Strategy formalisation: Strategy becomes increasingly formalised at each larger size category (statistically significant difference). However, there is considerable variation within categories, as illustrated in Figure 14, below. There is a low degree of formalisation in strategic management overall: the mean value is close to 3 (neutral) for the smallest firms, and only 3.64 for the largest firms in the study.

Figure 14: Strategy Formalisation by Firm Size



Strategy responsiveness: There are no statistically significant differences across size bands in terms of the responsiveness of strategic management in the sampled firms. The mean level of responsiveness is moderate (between ‘neutral’ and ‘agree’). There is also a wide range of variation across firms, even within size categories, as illustrated in the two examples below (figure 15). A substantial proportion fall below the ‘neutral’ level into ‘disagree’ – indicating a low degree of responsiveness in terms of managing strategy.

Figure 15: Strategy Responsiveness

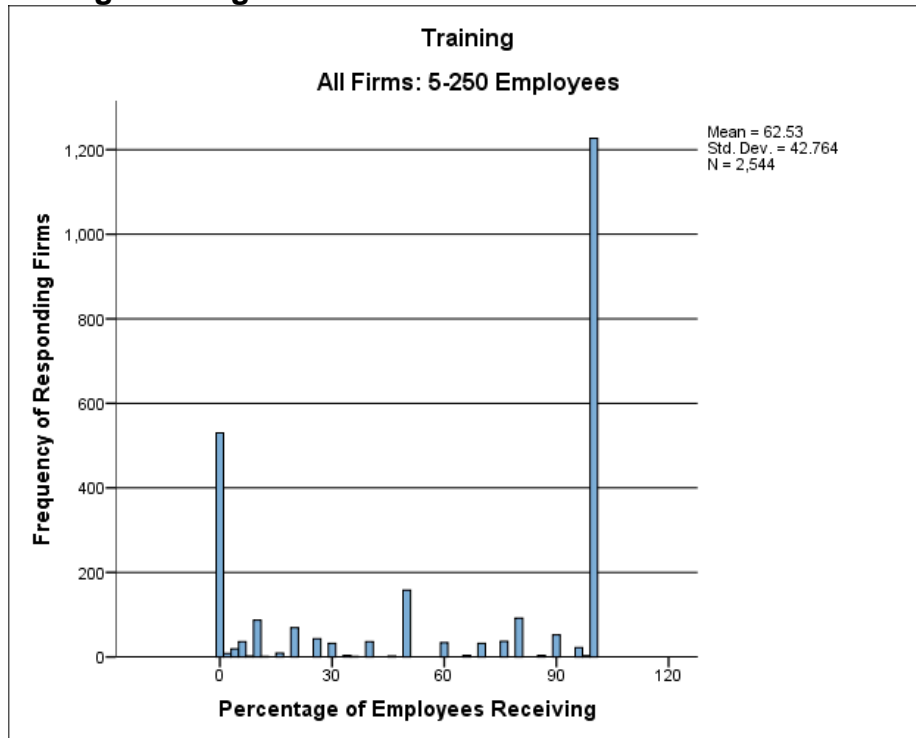


Measures of HR practices were also based upon subjective rating scales. However, unlike the questions concerning skills and strategic management, the response format for HR practices was the percentage of employees covered by each HR practice. Pairs of related

individual items were grouped and an average percentage score calculated. Thus the variable training reflects two items relating to the provision of specialised and generic training. The variable for staffing reflects the average of two items concerning the use of structured interviews and the use of standardised tests. We also grouped the two items for the use of variable pay and employee ownership, and for the use of employee participation and information sharing. In all cases the strength of the correlations between these pairs of questions justified this aggregation of scores. The variables then provide an indicator of the extent of coverage of all employees by these HR practices in terms of training, staffing, performance appraisal, variable pay and participation. Although we break HRM down into these five dimensions for this descriptive analysis, we subsequently created an index of overall HRM sophistication by summing the scores across all of the items into a single measure.

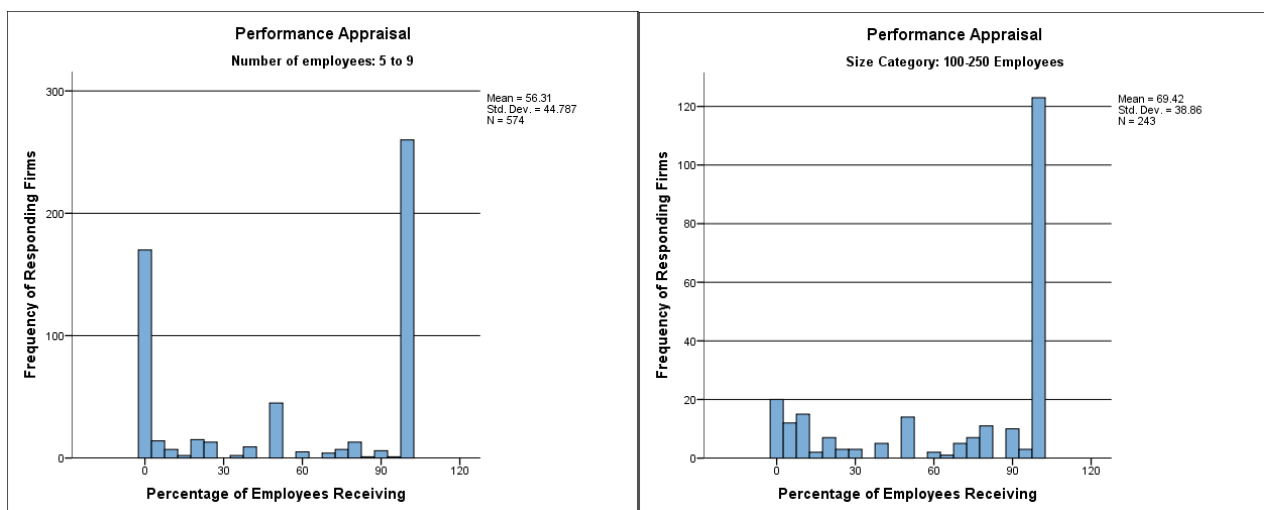
Training: There are no statistically significant differences across size categories in terms of the proportion of employees receiving specialised and general skills training in the sampled firms. There is wide variation in practice, and the average across the sample is a little over 60 per cent of employees receiving training provision. However, it is clear that approximately half of the sampled firms provide training to all employees, and the remainder vary widely in the coverage of training provision. This is illustrated in figure 16 below for all firms in the sample combined.

Figure 16: Training Coverage



Performance Appraisal: As might be expected, in the smallest firms significantly fewer employees are covered by performance appraisal than larger firms. However, there are no statistically significant differences among the other size categories in terms of the proportion of employees receiving performance appraisals. As illustrated in the examples in figure 17, particularly in smaller firms, the distribution is ‘bi modal’ with firms either covering all or no employees. This makes interpreting the mean somewhat misleading. This bi modal distribution suggests wide variation in practice.

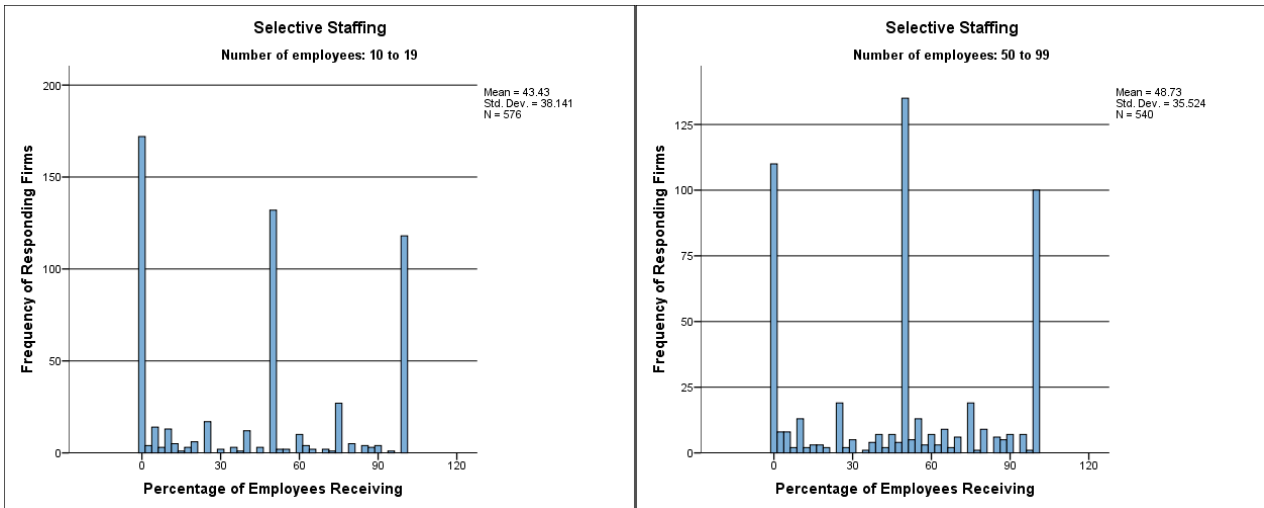
Figure 17: Performance Appraisal Coverage by Firm Size



Selective Staffing: The data suggest that the adoption of selective staffing practices increases for firms with more than 20 employees to a degree that is statistically significant.

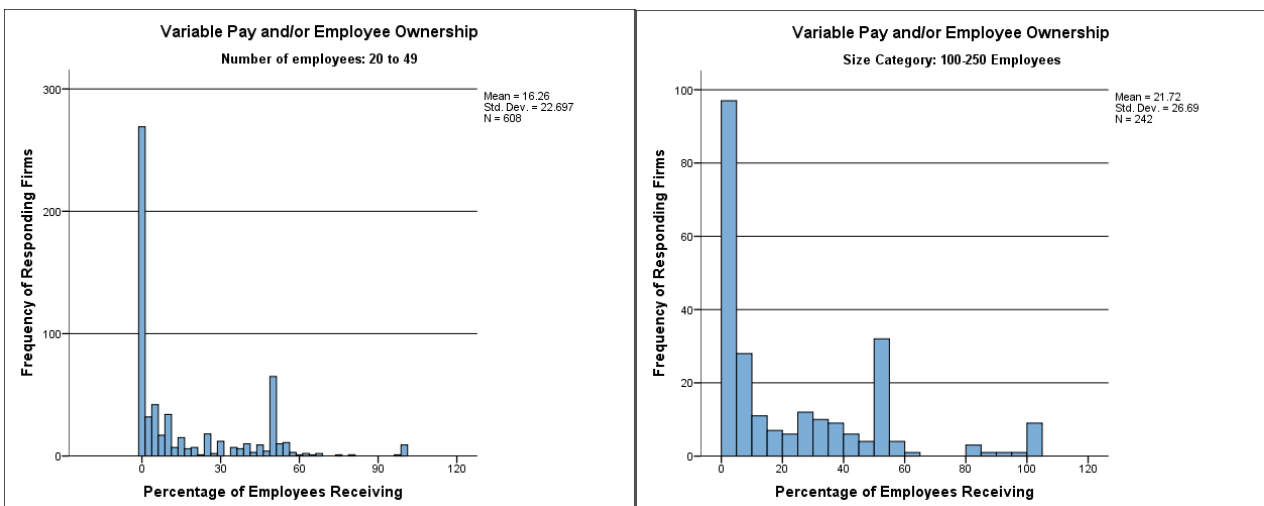
Above the threshold of 20 employees there are no further statistically significant differences in terms of the proportion of employees hired using selective staffing practices. In firms with more than 20 employees, mean coverage is close to 50 per cent of employees. However, as shown in the illustrative examples in figure 18, there is a high degree of variation within groups and selective staffing practices are equally likely to not be used at all.

Figure 18: Selective Staffing Coverage by Firm Size



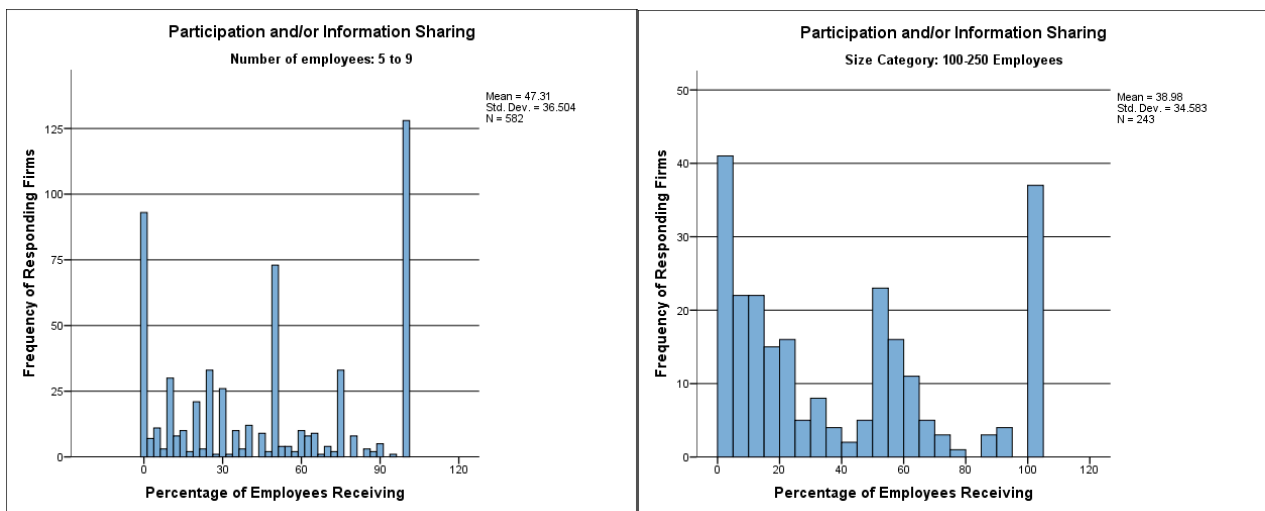
Variable Pay and Employee Ownership: The data suggest that the adoption of variable pay and employee ownership increases significantly for firms with more than 99 employees. Below that threshold there are no statistically significant differences in terms of the proportion of employees offered variable pay and/or employee ownership. The mean value overall is low, typically below 20 per cent of firms, and the variation is also quite low. In general, these are atypical compensation policies for SMEs in this sample. This is clearly illustrated in figure 19, which shows the distribution of these practices in firms with 20-49 and 100-250 employees.

Figure 19: Variable Pay and Employee Ownership Coverage by Firm Size



Information Sharing and Participation: firms in the smallest size band are statistically more likely to share information with employees and engage them in participative decision making than any other category. Above that threshold there are no statistically significant differences in terms of the proportion of employees who are engaged in participative decision-making. These differences are described graphically in figure 20. The mean value is around 40 per cent of firms, although the variation around that mean, even within size bands, is high.

Figure 20: Information Sharing and Participation Coverage by Firm Size



Conclusion: taken together, the data on distribution of management practices suggest generally low up-take of practices such as formalised strategy, and many of the so-called 'high performance' HR practices such as information sharing, participation in decision making, training, variable rewards, and employee ownership. This confirms other evidence that there is a 'long tail' of SMEs not employing management best practices in these domains.

How many businesses are we talking about?

In the UK 99.9% of the population of all firms are SMEs (5.2 million firms). However, according to the most recent Business Population statistics published by the UK Department for Business Innovation and Skills, only approximately 1.27 million of these SMEs have any employees.

The mean level of entrepreneurship skills on our 5-point scale is 4.05. This indicates that the average respondent generally agrees that they have good entrepreneurship skills when compared with others. However, this also means that 600,000 firms would be expected to score themselves below this average level, and that over approximately 200,000 firms would score below 3.4 on a 5 point scale (indicating overall a neutral rating on skills or worse). This bottom 16% falls significantly below the mean level and therefore has substantial opportunity for improvement in entrepreneurship skills. The pattern is consistent across the other three dimensions of skills.

With respect to management practices, we can take strategy formalisation as an example. The mean level of strategy formalisation is 3.2 (close to neutral or 'neither agree-nor-disagree' on our 5 point scale). The variation in strategy formalisation is very wide across all SMEs, and the bottom 16% of firms indicate that they *disagree or strongly disagree with all questions* relating to strategy formalisation (scoring at 2.0 or below on our five point scale). In other words, we estimate that there are over half a million SME employers that are not currently taking a formalised approach to strategic management. As shown in the next section, strategy formalisation has significant associations with performance outcomes.

These data indicate there is substantial room for improvement in both skills and management practices across a wide swathe of the UK population of firms.

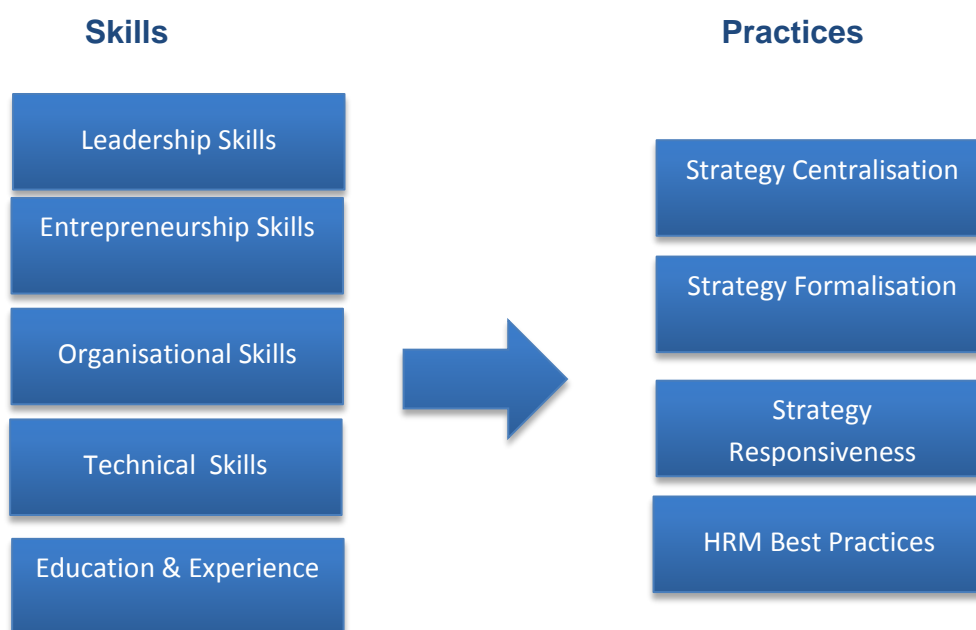
Linking Skills, Management Practices, and Performance

The central question driving this research is whether there is an association between L&M skills and firm performance. We have already noted that strategic management and HRM practices represent intermediate variables in the causal chain from skills to firm performance. What this means is that these management practices can be viewed as the outcome variables with respect to skills. However, management practices are also predictors of performance outcomes. Therefore, we report the results in two stages. The first stage examines the associations between L&M skills and management practices. In the second stage of our analysis, we estimate the association for L&M skills and practices together with firm performance outcomes.

Skills and Management Practices

A major reason why L&M skills are of interest is because of their expected association with the implementation of effective management practices. The relationships being examined in this first stage of analysis are summarized in Figure 21.

Figure 21: The potential associations between skills and management practices



In the following sections we summarise the statistically significant associations observed between skills and management practices after controlling for the influence of industry sector, firm size, age and ownership structure. Each of these factors is likely to impact the extent to which firms have developed good management practices in terms of strategy and HRM. For example, we found that as firms get older, holding all other factors constant, they are less likely to implement management best practices. That is, experience (at least at the firm level) does not appear to be the best teacher. We also found that, holding all

else constant, family firms were less likely to employ management best practices than non-family firms. While these other factors are potentially interesting, in the following sections we focus on the main effects between skills and practices after controlling for the influence of these other variables.

Strategic Management

The results of the regression analyses are presented in tables C1-C3 (Appendix C). We found that the four skill sets are each associated with strategic management in SMEs as follows:

- **Leadership skills** are positively related to strategy centralisation, formalisation and responsiveness.
- **Entrepreneurship skills** are positively related to strategy centralisation, formalisation and responsiveness.
- **Organisational skills** are positively associated with strategy centralisation only.
- **Technical skills** are positively related to strategy centralisation, formalisation and responsiveness, but to a lesser degree than leadership and entrepreneurship skills.

The main findings regarding education and experience are:

- **Level of education** is negatively associated with strategy centralisation.
- **More experienced leaders**, in terms of managing their own businesses, are more likely to report a centralised approach to strategic planning.
- **Management team size** is negatively associated with strategy centralisation, positively associated with formalisation, and unrelated to responsiveness.
- **International experience** is positively associated with strategic responsiveness.

Human Resource Management

In order to evaluate the association between skills and the implementation of HRM, we created an index of 'best practices' in terms of compensation, staffing, performance management, employee participation and training and development. The results of the regression analysis for HRM on education, experience and L&M skills are presented in table C4 (Appendix C). Controlling for family ownership, size, age and sector, the results indicate:

- **Leadership skills, entrepreneurship skills, and technical skills** are all positively associated with implementation of HRM best practices.
- **Organisational skills** are unrelated to HRM.
- **Education level, prior business ownership experience and international experience** are each positively associated with HRM.
- **Management team size** is positively associated with implementation of HRM practices.

Summary

Skills are associated with both strategic management and HRM, as would be expected. However, not all skills are equal. The most consistently and strongly associated skill sets are entrepreneurship and leadership, with a smaller role played by technical skills and almost no effect of organisational skills.

Before interpreting these results further, it is worth reviewing two additional sets of results: the association between skills, practices and performance outcomes; and the mediating role played by management practices in translating skills into performance.

Skills, Management Practices, and Performance and Growth

We next extended the analysis to include the three measures of performance: turnover (2013), productivity (2013) and employment growth (change in number of employees 2011-2013).

Turnover

Regression analysis results for turnover are presented in full in table C5 (Appendix C). The results show that family businesses have lower turnover than non-family firms. Firm age and size are, unsurprisingly, positively associated with turnover. The results of model 2 show that L&M skills contribute significantly to the prediction of turnover beyond sector, age, size and ownership structure. After taking control variables and L&M skills into account, variations in management practices account for a small, but statistically significant increment in the variation explained in turnover. The key statistically significant findings are as follows:

- **Entrepreneurship skills** are positively related to turnover.
- **Strategy formalisation** is positively associated with turnover (although statistically only marginally).
- **Strategy centralisation and strategy responsiveness** are both negatively associated with turnover.
- **HRM** is positively related to turnover.

The negative association for strategy responsiveness is to be expected, given that adapting a strategy to reflect new information may well signal new directions in terms of the business, with consequent reductions in turnover. The negative outcome for strategy centralisation signals the potential ineffectiveness of this approach to managing strategy.

Productivity

Regression analysis results for productivity are presented in full in table C6 (Appendix C). The results show that family businesses have lower productivity than non-family firms. Firm age is positively associated with turnover. However, size is surprisingly negatively associated with turnover within this sample. The results of model 2 show that industry experience and international experience are positively associated with productivity, although strangely, years spent managing one's own business are negatively associated with productivity.

L&M skills contribute significantly to the prediction of productivity beyond sector, age, size and ownership structure. However, while entrepreneurship skills are positively associated with productivity, leadership skills are negatively associated. After taking control variables and L&M skills into account, variations in management practices account for a small, but statistically significant increment in the variation explained in productivity. The key statistically significant findings are as follows:

- **Entrepreneurship skills** are positively and significantly associated with productivity.
- **Leadership skills** are negatively and significantly associated with productivity
- **Centralised strategy and responsive strategy** are both negatively associated with productivity
- **HRM** is positively associated with productivity.

The results for responsive strategy are not surprising, given the impact that changing strategy is likely to have upon efficiency. As with turnover, the results for centralised strategy suggest that centralisation of strategic management is not an effective management practice. We consider the negative coefficient estimate for leadership in a later section.

Growth

Regression analysis results for growth are presented in full in table C7 (Appendix C). The results show no differences for family versus non-family firms in terms of growth in employment. Firm age is negatively associated with employment growth while size is positive. The results of model 2 show that adding measures of experience and L&M skills to the equation does not contribute significantly to explaining the variation in growth among these firms. However, as shown in model 3, the inclusion of management practices does explain further variation in growth. The key statistically significant for growth finding is as follows:

- **Strategy responsiveness** is positively and significantly associated with employment growth.

Consistent with a priori expectations is the observation that firms with a responsive approach to strategic management are also more likely to grow. This triangulates with the fact that growth tends to be associated with lower productivity in the short run and our finding that responsive strategies are negatively associated with productivity. HRM was unrelated to growth.

Employment Growth in Small Firms

Given the weaker findings for growth we also explored whether different strata in the sample behaved differently. As a result of this analysis, we found the following very significant relationships for firms with between 20 and 49 employees (Table C.8):

- Work experience is negatively associated with growth – i.e., less experienced managers in terms of overall work experience, lead faster growing businesses
- However, entrepreneurial experience (years managing a business and number of businesses owned) is positively related to growth
- Leadership skills become non significant in explaining growth directly

- Entrepreneurship skills seem to matter, but are significantly mediated by their effects on the formalisation of strategic management (mediation effects are further explored in the next section)
- Skills and management practices are especially impactful for firms with between 20 and 49 employees. Both skills and practices explain significantly more variation in growth than the control variables for this group

Structural Equations Models

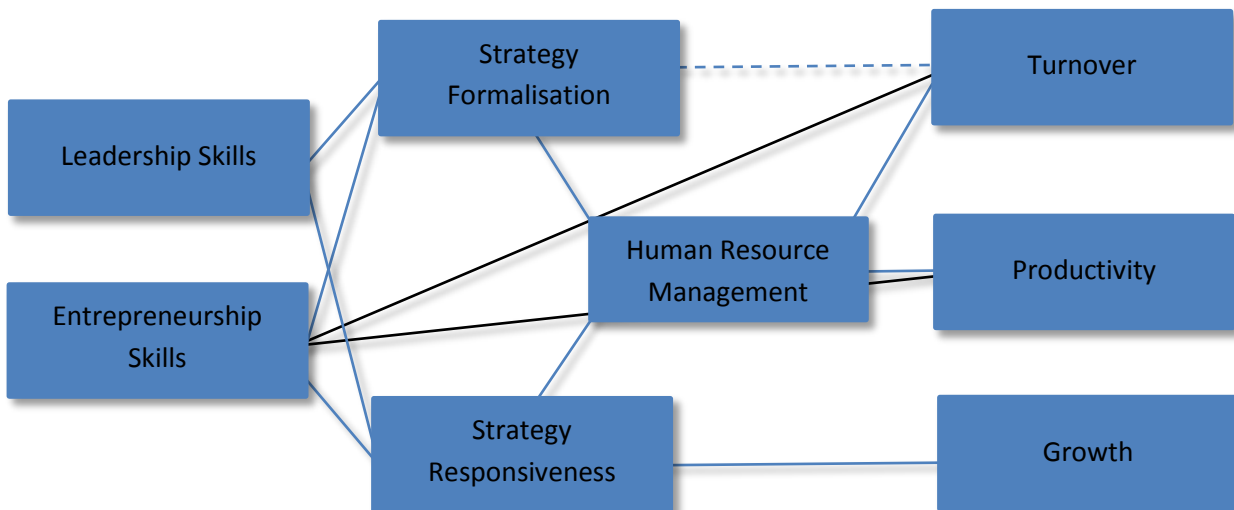
A more complete approach to analysing the simultaneous influences of multiple independent variables and multiple dependent variables is structural equations modelling (SEM). Using this approach, we examined hypothesised direct and indirect relationships between L&M skills, and SME performance and growth, via management practices.

Through an iterative process we eliminated insignificant associations, and ultimately arrived at the model described in Figure 22 below.⁶⁶ Full details of model fit for each sector and size category are included in Appendix D. Table D.1 shows the fit statistics for all models and provides strong support for the overall fit of this model. This supports the hypothesis that L&M skills (leadership and entrepreneurship skills) are positively associated with strategy formalisation and strategy responsiveness. Furthermore, the model indicates that strategy formalisation and responsiveness are positively associated with the implementation of HRM practices. Consistent with the earlier regression analysis, formalisation of strategy is positively associated with turnover, and strategy responsiveness is positively associated with growth. HRM practices are positively associated with turnover and with productivity.

Even after modelling these mediating relationships, we find that entrepreneurship skills are also positively and directly associated with both turnover and productivity. This is suggestive that entrepreneurship skills do more than support management practices. For example, they might lead directly to higher performance by facilitating the identification and pursuit of more valuable opportunities.

⁶⁶ The model shown is the final model resulting from a series of analyses which began with all variables. Iterative model fitting resulted in the simplified model shown in figure 22. In the final model, control variables were also included for both firm age and firm size (not shown in figure 22). The impact of industry sector was evaluated in a series of comparisons that assessed the extent to which sector moderates the relationships in the main model.

Figure 22: Structural Model Linking Skills to Performance*



* Model does not show control variables

Mediation Effects

As depicted in Figure 22 we assessed whether L&M skills influence performance and growth indirectly through their impact on management practices. This analysis was conducted using SEM (using SPSS AMOS software) employing bootstrapping to estimate the significance of indirect effects. The results are presented in full in table D.2 (Appendix D).

- Leadership influences productivity and turnover directly and indirectly via its impact on strategic management practices – however the indirect relationships are negative: more leadership skills are associated with lower levels of turnover. This result is explained by important differences across sectors described in the next section.
- Entrepreneurship skills positively influence productivity and turnover directly and indirectly via the implementation of strategic management practices – by promoting a more responsive strategy formulation process, and by promoting formalisation of strategic planning processes.
- The direct influence of entrepreneurship skills on performance is magnified by the presence of both responsive and formalised strategic planning processes – there is a synergistic relationship between skills and processes in influencing performance.

This is a test of the basic premise described in the introduction: L&M skills drive performance *through* their influence on the adoption of management best practices. With a few exceptions, our analysis provides support for this mediating role of practices between L&M skills and performance. In summary we found evidence that the strategic

management and HRM practices serve as mediating mechanisms for the association between entrepreneurship skills and firm performance.

Negative associations

The analysis identified two statistically significant negative associations between management best practices and performance. These were between strategy responsiveness and both turnover and productivity. These findings should not be interpreted as meaning that strategy responsiveness is not an appropriate and effective strategy for many businesses. Strategic responsiveness implies adapting strategic goals to new information. It also requires changing direction and possibly developing new capabilities in response to new market realities. It would be expected that this would incur costs, reducing productivity, and either cause, or be caused by declining turnover.

In addition, we found a negative association between leadership skills and turnover and productivity. These negative associations may be explained by observation that leadership is positively associated with strategy responsiveness which itself is negatively associated with these outcomes.

Thus while exerting a positive influence on strategic management practices, the net result of leadership skills is an apparent negative association with performance. However, this result might solely reflect what is an expected negative influence of strategy responsiveness on short run performance rather than the negative effects of leadership *per se*.

Size Differences

When analysed separately, we observed distinctly different patterns of observed relationships across different size categories.

- 100-250 employees:
 - No significant associations between skills, practices and any performance measures
- 50-99 employees:
 - Technical skills are positively associated with productivity
 - HRM positively associated with turnover and productivity
- 20-49 employees
 - Technical skills positively associated with turnover and productivity
 - Strategy formalisation positively associated with growth
- 10-19 employees
 - Entrepreneurship skills positively associated with turnover and productivity
- 5-9 employees:
 - Entrepreneurship skills positively associated with turnover and productivity
 - Strategy formalisation positively associated with turnover and productivity

It is clear that entrepreneurship skills are particularly impactful for smaller firms (5-19 employees), while technical skills become more important for mid-sized SMEs (20-99 employees). For smaller firms it is the skills associated with identifying and pursuing opportunities that are most strongly associated with performance. In mid-sized firms, technical and functional skills tend to be more significant for performance.

Across a variety of size categories we find significant impacts for strategy formalisation and responsiveness, while the strongest benefits from HRM appear to arise for firms with between 50 and 99 employees.

For the largest SMEs (100-250 employees) skills and practices are not significantly associated with performance metrics. This may occur because the link between the characteristics of individual managers and firm performance becomes more remote as organisations become more complex. It might also be a function of the relatively small size of this sub-sample (approximately 250 firms) and consequently lower statistical power to detect relatively small associations between these variables.

Sector Differences

We compared individual sectors against the rest of the sample. Here we highlight the major differences where any were observed for the variables of central interest.

Entrepreneurship Skills

While positively related to performance outcomes in the sample as a whole, entrepreneurship skills exhibit no direct relationship in Construction, and Accommodation and Food Services.

Entrepreneurship skills are more influential on strategic responsiveness in Real Estate and Professional Services than the sample as a whole, but are unrelated to responsiveness in Financial Services and Insurance.

Formalised Strategy

In Transportation, Storage and Communication and Accommodation and Food Services the relationships between formalised strategy and turnover and productivity are more strongly positive than the sample as a whole.

Human Resource Management

HRM is more significantly associated with growth in Manufacturing than in the wider population. This is consistent with evidence elsewhere of sectoral differences in the value of advanced HRM practices.⁶⁷

⁶⁷ Combs, Liu, and Hall, "How Much Do High-Performance Work Practices Matter? a Meta-Analysis of Their Effects on Organizational Performance."

Family Firms

The analysis included a measure of whether or not responding firms are family firms. This is important because of extensive evidence that shows that family firms lag behind non-family firms in terms of professional management and the adoption of HRM practices.⁶⁸

We labelled a firm as a family business if respondents first self-identify as a family firm, and then answer affirmatively either that one or more family member is in the management team or that a family member is expected to be the successor to the CEO. Approximately 60 per cent of respondents indicated that they were family firms.

The results of this study are consistent with prior evidence in that we find that being a family firm is negatively associated with the formalisation of strategic management, with the use of performance appraisal, careful employee selection processes, the use of variable incentive pay, employee ownership, information sharing and employee participation in decision making. These differences are statistically significant.

Correlates of Skills

An interesting question to ask is whether there are particular correlates of skills in terms of personal experience, work history, education level or field of study. The data indicate there is no significant association between the level of education and the self-reported skills of these executives. However, among those respondents with a university level qualification (representing 48% of the sample) we do find a clear pattern of relationships. A degree in business, finance or law is positively correlated with the level of entrepreneurship skills. A degree in STEM subjects is positively correlated with technical skills. Social science degrees are significantly correlated with higher levels of leadership skills.

In addition, international experience is positively correlated with both entrepreneurship skills and with technical skills. On the other hand, business ownership experience and overall work experience are the only correlates of higher levels of organisational skills. These observations suggest that although formal education overall may not guarantee the presence of key skill sets, the specific field of study pursued in higher education can be a meaningful driver of skills profiles.

⁶⁸ Astrachan, J.H. and Kolenko, T.A. (1994), "A neglected factor explaining family business success: human resource practices", *Family Business Review*, Vol. 7 No. 3, pp. 251-62; Reid, R. S., & Adams, J. S. (2001). Human resource management—a survey of practices within family and non-family firms. *Journal of European Industrial Training*, 25(6), 310-320; De Kok, J. M. P., Uhlaner, L. M. and Thurik, A. R. (2006), Professional HRM Practices in Family Owned-Managed Enterprises. *Journal of Small Business Management*, 44: 441–460.

What do these findings mean for SME owners and managers?

The evidence is strongly supportive of the notion that entrepreneurship skills are positively associated with good strategic management practices, good HRM practice, and ultimately firm performance. The benefits of entrepreneurship skills appear in terms of both revenues and growth, as well as indirectly with productivity via its effect on good people management practices.

An important practical takeaway from this research is that owner managers should understand the fundamental benefits of a formal approach to strategic planning, communication, and adaptation, as well as being able to connect HRM practices to the strategic planning process. Support for the development of good practices in these areas is widely available from both public and private providers, ranging from universities to consultants, and including business support advice from Local Enterprise Partnerships and business development programmes such as the Growth Accelerator programme (<http://www.growthaccelerator.com/>).

The results also indicate that skills matter, but not all skills matter equally. Given limited resources, especially time, SME owner-managers may benefit most significantly from ensuring that their entrepreneurship skills and leadership skills are well polished. The benefits of these skill sets are felt most strongly in improved strategy formalisation and strategic flexibility. This suggests that either direct investments in knowledge and skills with respect to strategic management, or investments in more general understanding of entrepreneurial processes such as opportunity recognition, business modelling and market development are expected to be beneficial.

Of course, this begs the question, 'can entrepreneurial skills be taught'? Fortunately, there is growing evidence that entrepreneurship skills are trainable, and that such training can impact both knowledge and personal efficacy with respect to key entrepreneurial tasks. Entrepreneurship education is becoming widespread and is accessible not only within schools, further education and higher education institutions, but is also accessible through established sources of business support.

References:

Henry, C., Hill, F., & Leitch, C. (2005). Entrepreneurship education and training: can entrepreneurship be taught? Part I. *Education + Training*, 47(2), 98-111.

Kantor, J. (1988). Can entrepreneurship be taught?: A Canadian Experiment. *Journal of Small Business & Entrepreneurship*, 5(4), 12-19; Katz, J. A. (2007). Education and Training in Entrepreneurship.

Discussion

We have sought to identify associations between L&M skills, management practices, and measures of firm performance and growth with a view to providing evidence of use for policymaking in the areas of skills and business growth. A further objective was to identify differences in associations within specific strata of the population, by sector and size.

While there are numerous leadership taxonomies the majority of these are designed with a view to understanding leadership in large organisations. There has been only a limited body of work identifying the common and unique features of L&M skills in an SME context. However, the limited research does suggest some commonalities in terms of the dimensions of skills (leadership/human influence, organisation/administrative/resource allocation, technical skills). In addition, the SME specific research does suggest the need to consider entrepreneurship as a distinct skill set. Entrepreneurship includes opportunity identification and exploitation and there is a significant body of work that addresses this sub domain of management activity.

The four dimensions of leadership, entrepreneurship, organisational and technical skills are independent of one another so that summing them to create an index would not be useful. A summative index would allow the four dimensions to compensate for one another. This would not be appropriate since the different dimensions are observed to hold different relationships across outcomes.

Skills and Performance

While the measure of L&M skills captures four dimensions, we find that two of these stand out in terms of explaining performance outcomes: leadership and entrepreneurship. Of these, entrepreneurship skills present the most stable pattern of relationships: they are consistently positively related to both turnover and productivity. A long tail in terms of entrepreneurship skills of SME leaders can help explain the long tail of SME performance in terms of turnover, productivity and growth.

The effect of L&M skills operates indirectly through the implementation of management best practices in strategy and HRM. We found particularly significant associations among leadership, entrepreneurship, strategy formalisation, responsiveness and performance. The formalisation and responsiveness of strategic management practices significantly mediate the influence of leadership and entrepreneurship on turnover and productivity.

L&M skills have both direct and indirect associations with performance. Practices in part reflect the impact of skills, but do not fully account for their impact on performance. We also find that while the associations between skills and practices tend to be positive, the relationship with performance outcomes is more complex.

Key differences

While the analytical models tested hold true across the sample, the data clearly suggest some differences by size and sector. Entrepreneurial skills are most important for firms

between 5 and 19 employees. Technical skills become more important for firms with between 20 and 99 employees. Strategy formalisation and responsiveness play a significant role across most size categories, while HRM appears most important for those mid-sized SMEs with between 50 and 99 employees.

The differences across sectors suggest that different skill sets may exert different influences on outcomes. These may be caused by both importance and opportunity. The importance of different skill sets is expected to vary, for example based upon the dynamism and rate of change in an industry (entrepreneurship), variations in labour intensity (leadership) or organisational complexity (organisational skills). On the opportunity side, sectors are not facing the same environments – some have more growth opportunities than others, and there are variations in the ways in which growth opportunities might be pursued (market penetration versus new market development). This also suggests that a deeper analysis is required, going beyond the relatively holistic analysis reported here.

Limitations

The study has examined a highly diverse population, in terms of both size and sector. This population also varies in terms of ownership (family vs. non family), and management structure (individual owner managers vs. teams). We have controlled for these differences both by design, (stratified sampling) and statistically by modelling the influence of these factors in addition to the variables of interest. However, these differences have significant implications not only for the relationships between L&M skills, practices and outcomes, but also the ways in which these variables can be effectively operationalised in a single study. We have sought to overcome this challenge by examining a limited set of relatively general management practices (strategy and HRM). The evidence suggests that this approach has worked. However, it does also mean that further examination of the association between L&M skills and other practices would be of value. In particular, some practices may be more relevant for growth through market penetration (e.g., operations management, total quality, continuous improvement) than for growth through the identification and exploitation of new market opportunities (e.g., financial capabilities, market development, organisational learning).

It is quite possible that the timing of this study, conducted not long after a period of economic contraction, may have dampened the relationships between skills and growth. Certainly the performance and growth measures will have been impacted by the macroeconomic conditions. To the extent that these conditions cause reduced variation in the performance metrics for all firms, we would expect to see weaker correlations between skills and practices and these outcomes. In this light, we might interpret the relationships observed as being a conservative estimate of the importance of L&M skills for performance.

Conclusion

This study demonstrates that L&M skills do matter in predicted (and a few unpredicted) ways for explaining performance and growth in SMEs. Of all of the dimensions measured, the most important predictor of positive performance is entrepreneurship skills. L&M skills are more strongly associated with good management practices than more distant measures of performance outcomes. This is to be expected, given the impact of a wide range of uncontrollable factors on the ultimate performance of a firm. The evidence is strong that good management is predictive of economic development. The present research confirms that skills are associated with the adoption of good management practices.

These findings suggest an evidence-based rationale for possible policy development. The descriptive data indicate that L&M skills are relatively under-developed in many SMEs. However, these skills are associated with the adoption of associated management best practices - which themselves are positively related to firm performance. The evidence therefore indicates that under-developed L&M skills and an associated widespread failure to adopt management best practices may be constraining the performance and growth of a large number of UK SMEs. The results also provide suggestions regarding the policy options available. That is, the study has identified which aspects of L&M skills are the most important in terms of improving firm performance, the management best practices that are most influential, and also which categories (sectors and size bands) of business might achieve the greatest benefits.

Appendix A: Questionnaire

Q1: Please can I check that I am speaking to the owner or one of the top managers of this business? By that I mean someone who fulfils two of the following three criteria;
Owns at least 10% equity share in the business;
They are actively engaged in setting the strategic direction of the business;
They are actively engaged in implementing the strategic direction of the business.

Q2: Please can I check the size of you business, are there between 5 and 249 employees?

Q3: Is your organisation a charity or not for profit organisation?

Q4: Are you the founder of the business?

Q5: What year did you start the business?

Q6: How long have you been with the firm in years? _

Q7: How many individuals in your business, including yourself, would fulfil at least two of the following three criteria:

- a. They own at least 10% equity share in the business
- b. They are actively engaged in setting the strategic direction of the business
- c. They are actively engaged in implementing the strategic direction of the business

Q8: Would you be willing to allow us to contact one of these other members of your team?

Q9: What is their name/are their names?

Q10: If it is more convenient, would you like us to use a different number to contact them? Which number should we use instead?

Q11: From the following list I am going to read out, can you tell me when we come to a qualification that you hold?

Q12: In what field is your highest qualification? Is it in....

Q13: How many years experience do you have in your current industry?

Q14: How many years have you been working in total?

Q15: Have you ever worked outside the UK?

Q16: Have you any experience selling outside of the UK?

Q17: How many years have you spent managing your own business?

Q18: How many businesses have you owned (including currently owned businesses) in which you had at least 10% equity as well as strategic decision making power?
(INTERVIEWER ADD IF NECESSARY: Including any business you currently own)

Q19: In which year did you own your first business?

Q20: Is your business a family owned business - a family business is majority owned by members of the same family?

Q22: How many family members are involved in managing the business at any level?

Q23: Is the future successor as CEO/Managing Director of the business expected to be a member of the owning family?

Q25: Thinking about the development of your business over the next five years
If the number of employees in your firm were to grow by 25 percent, do you feel that would be largely positive or negative

Q26: And if the number of employees in your firm were to grow by 100 percent, do you feel that would be largely positive or negative?

Q29a: Relative to others, (Form A = I, Form B = this team) accurately perceive gaps in the marketplace

Q29b: One of (Form A = my, Form B = our) greatest strengths is identifying the goods or services people want

Q29c: (Form A = I am, Form B = We are) skilled at taking advantage of high quality business opportunities

Q29d: (Form A = I am, Form B = This management team is) skilled at identifying those products or services that provide real benefit to customers

Q30a: Relative to others, one of (Form A = my, Form B = our) greatest strengths is achieving results by organising and motivating people

Q30b: (Form A = I am, Form B this team is) highly skilled at delegating work to others effectively

Q30c: One of my (Form B = team's) greatest strengths is (Form A = my, Form B = our) ability to supervise, lead and influence people in my organisation

Q31a: Relative to others (Form A = I am, Form B = this team is) skilled at making decisions about how to allocate limited resources most effectively

Q31b: One of (Form A = my, Form B = this team's) greatest strengths is organising resources and coordinating tasks

Q31c: Relative to others (Form A = I am, Form B = we are) skilled at keeping (Form A = my, Form B = our) organisation running smoothly

Q32a: One of (Form A = my, Form B = this team's) greatest strengths is (Form A = my) expertise in a technical or functional area

Q32b: Relative to others, (Form A = I am, Form B = this team is) skilled at developing goods or services that are technically superior

Approximately what percentage of your employees was covered by the following employment practices in the years 2012-2013

Q33a: What percentage of employees received formal training in company-specific skills (i.e. task or firm specific training)?

Q33b: What percentage of employees received formal training in generic skills (e.g. problem solving, communication skills)

Q33c: What percentage of employees received a regular (e.g. annual) formal performance appraisal?

Q33d: Ignoring entry-level jobs, what percentage of employees has been promoted from within?

Q34a: Had structured interviews, using standardised questions and scoring of answers

Q34b: Were given one or more employment tests prior to hiring (e.g. skills or aptitude tests)

Q35a: What percentage of your workforce shared in the financial ownership of the firm (e.g. stock, options, profit sharing or other means)?

Q35b: What percentage of non-managerial employees received variable pay: by which I mean some of their pay is contingent upon individual, team or firm performance)?

Q36a: What percentage of all employees is provided with information about operating performance, financial performance or strategic information (e.g. strategic mission, goals, tactics, competitor performance, ect.)?

Q36b: What percentage of non-managerial employees are involved in any programme designed to elicit employees participation or input in decision making (e.g. self-managed teams, quality circles, problems solving or similar groups)?

Q37: Did any of the top management team in the business receive formal off-the-job or informal on the job training or development during the last 12 months?

Q38: What subjects or disciplines did that training or development cover?

Q39: Approximately how many employees left the organisation in the last year?

Q40a: Strategy, for this company is primarily set up by (Form A = myself as, Form B = the) Managing Director/Chief Executive

Q40b: (Form A = I, Form B = The MD/CEO and a few of the top managers) primarily define our firm's 'vision' - its basic purpose and general direction

Q40c: (Form A = I, Form B = The MD/CEO and a few of the top managers) primarily determine and execute the strategy based upon my analysis of the business situation

Q40d: I regularly challenge our people with new goals and aspirations

Q40e: I have a 'vision' about where this company will be in the future and do my best to communicate this sense throughout the organisation

Q40f: I serve as a personal example of the way our people should behave

Q41a: Our company adopts a written strategic plan each year to guide our operating activities

Q41b: Strategic planning in our firm is a formal procedure occurring in a regular cycle

Q41c: We have a written mission statement that is communicated to employees

Q42a: Formal analysis of the business environment and our competitors forms the basis for our company's strategic plan

Q42b: Strategy is the result of an on-going dialogue between managers, staff and executives

Q42c: Business planning in our company is on-going, involving everyone in the process to some degree

Q42d: Most people in this company have input into decisions that affect them

Q42e: Our company continually adapts its strategy based upon feedback from the market

Q43a: Most people in this organisation are willing to take risks on behalf of the organisation

Q43b: People are encouraged to experiment in this company so as to identify new, more innovative approaches or products

Q43c: Employees in this company understand what needs to be accomplished in order for the organisation to survive and prosper

Q44a: My (Form A = organisation, Form B = management team) has confidence in itself

Q44b: My (Form A = organisation, Form B = team) believes it can become unusually good at producing high quality work

Q44c: My (Form A = organisation, Form B = team) feels it can solve any problem it encounters

Q44d: My (Form A = organisation, Form B = team) believes it can be very productive

Q48a: My (Form A = organisation, Form B = team) expects to be known as a high performing (Form A = company, Form B = group)

Q48b: My (Form A = organisation, Form B = team) can get a lot done when it works hard

Q48c: No task is too tough for my (Form A = organisation, Form B = team)

Q48d: My (Form A = organisation, Form B = team) expects to have a lot of influence in (Form A = the industry, Form B = this business)

Appendix B: Reliability Analysis

Table B.1 Internal consistency and interrater reliability estimates

	<i>N</i>	<i>Cronbach's Alpha</i>	<i>ICC(1,1)</i>	<i>ICC(1,k)</i>
<i>Entrepreneurial Skills</i>				
		<i>(solo managers/managers in teams)</i>		
29.1	455		.092*	.169*
29.2	458		.112**	.202**
29.3	458		.133**	.235**
29.4	462		.071¶	.171¶
Scale	465	.734/.726	.160***	.276***
<i>Leadership Skills</i>				
30.1	464		.195***	.327***
30.2	462		.236***	.381***
30.3	463		.173***	.295***
Scale	465	.808/.798	.268***	.422***
<i>Organisational Skills</i>				
31.1	464		.080*	.147*
31.2	465		.130**	.230**
31.3	465		.127***	.226***
Scale	465	.758/.724	.123**	.219**
<i>Technical Skills</i>				
32.1	450		.274***	.430***
32.2	439		.244***	.392***
Scale	457	.744/.787	.303***	.466***
<i>HRM</i>				
33.1	449		.174***	.297***
33.2	447		.164***	.282***
33.3	453		.433***	.605***
33.4	429		.179***	.304***
34.1	442		.257***	.408***
34.2	442		.269***	.424***
35.1	451		.342***	.510***
35.2	448		.445***	.616***
36.1	456		.361***	.531***
36.2	453		.306***	.469***
Scale	465	.670/.668	.431***	.602***

Table B.1 (continued)

	<i>N</i>	<i>Cronbach's Alpha</i>	<i>ICC(1,1)</i>	<i>ICC(1,k)</i>
<i>Centralised Strategy</i>				
40.1	461		.214***	.352***
40.2	459		.083*	.153*
40.3	458		.094*	.173*
Scale	464	.561/.505	.147**	.256**
<i>Formalised Strategy</i>				
41.1	461		.298***	.459***
41.2	461		.227***	.369***
41.3	454		.307***	.469***
Scale	463	.782/.791	.345***	.513***
<i>Responsive Strategy</i>				
42.2	459		.141***	.247***
42.3	464		.173***	.294***
42.4	465		.246***	.395***
Scale	465	.781/.798	.248***	.397***

Notes: ¶ =p<.1; * =p<.05 ** =p<.01; *** =p<.001

Appendix C: Regression tables

The Predictors of Practices

Table C.1 Regression of Centralised Strategy Formulation on Education, Experience and Skills

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	-.032	.060	-.034	.060	-.018	.058
Manufacturing	-.037	.064	-.042¶	.064	-.042¶	.062
Electricity, Gas, Water supply	-.039	.062	-.031	.062	-.022	.060
Construction	-.011	.062	-.007	.061	-.016	.059
Wholesale & Retail	-.035	.063	-.032	.063	-.025	.061
Accommodation & Food Services	-.018	.066	-.012	.066	-.013	.064
Transportation, Storage, Communications	.013	.061	.015	.060	.016	.059
Financial & insurance	-.053*	.076	-.038	.076	-.035	.073
Real estate, Professional Services	-.010	.064	-.010	.063	-.007	.061
Education and Health	-.052¶	.059	-.030	.059	-.041	.057
Family business	-.007	.029	-.005	.029	-.007	.028
Firm Age	-.082***	.014	-.090***	.015	-.055*	.014
Number of Employees	-.047*	.000	-.018	.000	-.027	.000
Level of education			-.059**	.011	-.044*	.010
Industry experience			.011	.002	.008	.002
Work experience			-.034	.002	-.036	.002
Years managing own business			.069*	.002	.056*	.002
Number of businesses owned			-.010	.08	-.006	.008
International experience			.018	.020	.004	.019
Team Size			-.107***	.007	-.114***	.007
Leadership Skills					.057*	.023
Entrepreneurship Skills					.151***	.026
Organisational Skills					.088**	.028
Technical Skills					.046*	.017
Adj R2	.009		.027		.094	
F	2.748***		4.360***		11.648***	
R2 Change			.020***		.069***	

Notes: ¶ = p < .1; * = p < .05; ** = p < .01; *** = p < .001

Table C.2 Regression of Formalised Strategy Formulation on Education, Experience and Skills

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	-.129***	.108	-.133***	.107	-.106***	.102
Manufacturing	-.014	.115	-.015	.116	-.008	.109
Electricity, Gas, Water supply	-.041	.111	-.048¶	.112	-.032	.106
Construction	-.019	.110	-.022	.110	-.029	.104
Wholesale & Retail	-.074**	.113	-.080**	.113	-.065**	.106
Accommodation & Food Services	-.061*	.118	-.067**	.118	-.059*	.112
Transportation, Storage, Communications	-.063*	.109	-.064**	.109	-.057*	.103
Financial & insurance	-.060**	.136	-.066**	.136	-.061**	.129
Real estate, Professional Services	-.035	.114	-.033	.114	-.024	.108
Education and Health	.072**	.105	.069**	.106	.062*	.100
Family business	-.049**	.052	-.048*	.052	-.046*	.049
Firm Age	-.092***	.025	-.104***	.026	-.058**	.025
Number of Employees	.173***	.001	.161***	.001	.154***	.001
Level of education			-.016	.019	.003	.018
Industry experience			.048¶	.003	.043	.003
Work experience			.008	.003	.007	.003
Years managing own business			-.026	.003	-.039	.003
Number of businesses owned			.002	.015	.008	.014
International experience			.022	.036	.001	.034
Team Size			.077***	.013	.063***	.012
Leadership Skills					.160***	.040
Entrepreneurship Skills					.185***	.045
Organisational Skills					-.015	.049
Technical Skills					.090***	.030
Adj R2	.071		.076		.179	
F	15.450***		11.112***		23.284***	
R2 Change			.008**		.103***	

Notes: ¶ =p<.1; * =p<.05 ** =p<.01; *** =p<.001

Table C.3 Regression of Responsive Strategy Formulation on Education, Experience and Skills

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	-.028	.074	-.034	.074	.001	.067
Manufacturing	-.021	.080	-.017	.080	-.009	.072
Electricity, Gas, Water supply	-.048¶	.077	-.053*	.077	-.033	.070
Construction	-.052*	.076	-.049¶	.076	-.061**	.069
Wholesale & Retail	-.007	.078	-.009	.078	.010	.070
Accommodation & Food Services	-.033	.082	-.033	.082	-.027	.074
Transportation, Storage, Communications	-.028	.075	-.025	.075	-.019	.068
Financial & insurance	.012	.094	.013	.094	.021	.085
Real estate, Professional Services	-.013	.079	-.010	.079	-.001	.071
Education and Health	.078**	.073	.078**	.074	.066**	.066
Family business	-.004	.036	-.001	.036	.001	.032
Firm Age	-.100***	.017	-.115***	.018	-.053*	.017
Number of Employees	-.005	.000	-.007	.000	-.016	.000
Level of education			-.001	.013	.026	.012
Industry experience			.035	.002	.028	.002
Work experience			-.016	.002	-.018	.002
Years managing own business			.043	.002	.023	.002
Number of businesses owned			-.003	.010	.007	.009
International experience			.063**	.025	.036*	.022
Team Size			.025	.009	.009	.008
Leadership Skills					.203***	.027
Entrepreneurship Skills					.235***	.030
Organisational Skills					.026	.033
Technical Skills					.117***	.020
Adj R2	.025		.030		.223	
F	5.939***		4.836***		30.427***	
R2 Change			.008**		152.363***	

Notes: ¶ =p<.1; * =p<.05 ** =p<.01; *** =p<.001

Table C.4 Regression of HRM Practices on Education, Experience and Skills

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	.013	.047	.039	.047	.029	.045
Manufacturing	-.005	.044	-.008	.043	-.014	.042
Electricity, Gas, Water supply	.002	.044	.015	.044	-.006	.043
Construction	.018	.044	.026	.044	.020	.042
Wholesale & Retail	.024	.048	.032	.047	.022	.046
Accommodation & Food Services	-.040	.045	-.034	.044	-.047¶	.043
Transportation, Storage, Communications	.121***	.056	.114***	.056	.108***	.054
Financial & insurance	.055¶	.047	.065*	.046	.054*	.045
Real estate, Professional Services	.178***	.044	.166***	.044	.143***	.043
Education and Health	.095***	.043	.101***	.042	.085***	.041
Family business	-.085***	.021	-.077***	.021	-.076***	.020
Firm Age	-.139***	.001	-.141***	.001	-.106***	.001
Number of Employees	.092***	.000	.067**	.000	.062**	.000
Level of education			.114***	.008	.129***	.007
Industry experience			.055¶	.001	.051¶	.001
Work experience			-.050¶	.001	-.052¶	.001
Years managing own business			.018	.001	.009	.001
Number of businesses owned			.035¶	.006	.040*	.006
International experience			.071***	.014	.056**	.014
Team Size			.077***	.005	.067***	.005
Leadership Skills					.105***	.016
Entrepreneurship Skills					.137***	.018
Organisational Skills					.015	.020
Technical Skills					.053**	.012
Adj R2	.096		.122		.177	
F	21.093***		18.122***		23.117***	
R2 Change			.028***		.056***	

Notes: ¶ = p < .1; * = p < .05 ** = p < .01; *** = p < .001

The Predictors of Performance and Growth

Table C.5 Regression of Turnover on Skills and Practices

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	.171***	.089	.165***	.087	.174***	.087
Manufacturing	.162***	.096	.163***	.094	.164***	.093
Electricity, Gas, Water supply	.268***	.092	.248***	.090	.252***	.090
Construction	.210***	.091	.210***	.089	.211***	.089
Wholesale & Retail	.286***	.093	.272***	.091	.278***	.091
Accommodation & Food Services	.194***	.098	.181***	.096	.184***	.095
Transportation, Storage, Communications	.066**	.090	.061**	.088	.091**	.088
Financial & insurance	.087***	.113	.064***	.111	.063***	.111
Real estate, Professional Services	.009	.095	.010	.092	.013	.092
Education and Health	.028	.087	.009	.086	.007	.086
Family business	-.041*	.043	-.043*	.042	-.037*	.042
Firm Age	.095***	.021	.108***	.022	.110***	.022
Number of Employees	.519***	.001	.483***	.001	.471***	.001
Level of education			.001	.016	-.006	.016
Industry experience			.042¶	.002	.040¶	.002
Work experience			-.031	.003	-.030	.003
Years managing own business			-.062**	.003	-.058**	.003
Number of businesses owned			-.008	.012	-.011	.012
International experience			.073***	.029	.072***	.029
Team Size			.139***	.011	.130***	.011
Leadership Skills			-.075***	.035	-.070	.035
Entrepreneurship Skills			.070***	.038	.078***	.039
Organisational Skills			.003	.042	.007	.042
Technical Skills			.003	.026	.007	.026
Centralised Strategy					-.034*	.030
Formalised Strategy					.033¶	.019
Responsive Strategy					-.075***	.029
HRM					.062***	.047
Adj R2	.419		.454		.460	
F	136.966***		85.705***		75.430***	
R2 Change			.037***		.007***	

Notes: ¶ = p < .1; * = p < .05; ** = p < .01; *** = p < .001

Table C.6 Regression of Productivity (Turnover/Employee) on Skills and Practices

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	.225***	.081	.218***	.080	.225***	.080
Manufacturing	.223***	.087	.226***	.086	.227***	.086
Electricity, Gas, Water supply	.252***	.084	.229***	.083	.233***	.083
Construction	.240***	.083	.240***	.082	.242***	.082
Wholesale & Retail	.300***	.085	.287***	.084	.292***	.083
Accommodation & Food Services	.176***	.089	.164***	.088	.166***	.087
Transportation, Storage, Communications	.011	.082	.007	.081	.016	.081
Financial & insurance	.135***	.103	.111***	.102	.108***	.102
Real estate, Professional Services	-.016	.086	-.016	.084	-.013	.084
Education and Health	-.008	.079	-.027	.079	-.029	.079
Family business	-.049**	.039	-.049**	.039	-.043*	.039
Firm Age	.071***	.019	.086***	.020	.087***	.020
Number of Employees	-.170***	.001	-.204***	.001	-.212***	.001
Level of education			.001	.014	-.008	.014
Industry experience			.056*	.002	.054*	.002
Work experience			-.040	.002	-.039	.002
Years managing own business			-.067**	.002	-.063*	.002
Number of businesses owned			-.013	.011	-.016	.011
International experience			.093***	.027	.092***	.027
Team Size			.122***	.010	.113***	.010
Leadership Skills			-.074***	.032	-.067**	.032
Entrepreneurship Skills			.072***	.035	.083***	.036
Organisational Skills			-.005	.039	-.001	.039
Technical Skills			.012	.023	.017	.024
Centralised Strategy					-.039*	.028
Formalised Strategy					.010	.017
Responsive Strategy					-.071***	.026
HRM					.071***	.043
Adj R2	.229		.263		.269	
F	56.834***		37.373***		33.140***	
R2 Change			.037***		.007***	

Notes: ¶ = p<.1; * = p<.05 ** = p<.01; *** = p<.001

Table C.7 Regression of Three-Year Growth (Number of Employees) on Skills and Practices

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	.055*	.467	.055*	.470	.053¶	.472
Manufacturing	.032	.501	.035	.506	.033	.506
Electricity, Gas, Water supply	-.014	.483	-.008	.488	-.009	.490
Construction	.003	.478	.006	.482	.007	.483
Wholesale & Retail	.000	.489	.001	.492	-.001	.493
Accommodation & Food Services	.029	.514	.033	.517	.034	.517
Transportation, Storage, Communications	-.016	.473	-.017	.476	-.020	.479
Financial & insurance	-.007	.593	-.006	.599	-.005	.601
Real estate, Professional Services	-.010	.497	-.008	.497	-.009	.497
Education and Health	.041	.457	.046¶	.464	.041	.464
Family business	.020	.225	.017	.227	.015	.228
Firm Age	-.175***	.109	-.172***	.117	-.172***	.117
Number of Employees	.167***	.003	.168***	.003	.168***	.003
Level of education			.016	.084	.018	.084
Industry experience			.023	.013	.022	.013
Work experience			-.065*	.014	-.066*	.014
Years managing own business			.037	.014	.037	.014
Number of businesses owned			.015	.064	.016	.064
International experience			-.026	.156	-.026	.157
Team Size			-.019	.057	-.021	.057
Leadership Skills			-.040	.186	-.052*	.189
Entrepreneurship Skills			.028	.207	.016	.214
Organisational Skills			.022	.229	.023	.229
Technical Skills			-.012	.138	-.019	.139
Centralised Strategy					-.017	.165
Formalised Strategy					.020	.103
Responsive Strategy					.066**	.156
HRM					-.035	.142
Adj R2	.045		.046		.048	
F	9.957***		5.932***		5.449***	
R2 Change			.005 n.s.		.004*	

Notes: ¶ = p < .1; * = p < .05 ** = p < .01; *** = p < .001

Table C.8 Regression of Three-Year Growth (Number of Employees) on Skills and Practices in Firms with 20-49 Employees

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	Beta	S.E.	Beta	S.E.	Beta	S.E.
Agriculture; Forestry & Fishing; Mining and Quarrying	.141*	.559	.135*	.554	.148**	.553
Manufacturing	.074	.683	.074	.672	.075	.667
Electricity, Gas, Water supply	.023	.550	.036	.552	.042	.549
Construction	.019	.675	.014	.667	.014	.664
Wholesale & Retail	.009	.564	.001	.556	.004	.553
Accommodation & Food Services	.013	.635	.013	.627	.013	.623
Transportation, Storage, Communications	.043	.602	.036	.600	.031	.597
Financial & insurance	-.017	.912	.007	.901	.018	.895
Real estate, Professional Services	.008	.594	.006	.584	.011	.580
Education and Health	.086	.512	.093	.509	.092	.507
Family business	.023	.285	.022	.282	.036	.283
Firm Age	-.213***	.143	-.189***	.151	-.191***	.150
Number of Employees	.036	.016	.035	.016	.033	.016
Level of education			-.011	.106	-.010	.106
Industry experience			.044	.017	.037	.016
Work experience			-.167**	.018	-.177**	.018
Years managing own business			.090	.016	.105¶	.016
Number of businesses owned			.169***	.086	.171***	.086
International experience			.009	.192	.004	.191
Team Size			-.073¶	.078	-.067	.079
Leadership Skills			-.065	.229	-.078	.230
Entrepreneurship Skills			.092¶	.268	.054	.283
Organisational Skills			.021	.278	.011	.276
Technical Skills			.034	.173	.026	.173
Centralised Strategy					.039	.199
Formalised Strategy					.162***	.126
Responsive Strategy					.019	.205
HRM					-.090¶	.314
Adj R2	.042		.086		.102	
F	2.948***		3.276***		3.356***	
R2 Change			.061***		.022**	

Notes: ¶ = p < .1; * = p < .05; ** = p < .01; *** = p < .001

Appendix D: Structural Equations Models

Table D.1 Fit Statistics for Structural Models of Skills, Practices and Performance Across Sectors and Firm Size

<i>Model</i>	<i>Chi-square (df)</i>	<i>NFI^a</i>	<i>TLI^b</i>	<i>CFI^c</i>	<i>RMSEA^d</i>
Sector A: Agriculture, Fishing, Forestry	89.990 (22) p<.001	.990	.967	.992	.035
Sector B,D, & E: Mining, Quarrying, Electricity, Gas & Water	99.855 (22) p<.001	.989	.963	.991	.037
Sector C: Manufacturing	99.244 (22) p<.001	.988	.963	.991	.037
Sector F: Construction	116.866 (22) p<.001	.987	.955	.989	.041
Sector G: Wholesale and Retail	99.058 (22) p<.001	.988	.962	.991	.037
Sector H&J: Transportation, Storage and Communication	105.333 (22) p<.000	.988	.960	.990	.038
Sector I: Accommodation and Food Services	103.896 (22) p<.001	.988	.961	.990	.038
Sector K: Financial Services and Insurance	98.926 (22) p<.001	.989	.963	.991	.037
Sector LM&N: Real Estate and Professional Services	127.134 (22) p<.001	.986	.951	.988	.043
Sector P&Q: Education & Health	118.545 (22) p<.01	.986	.953	.989	.041
Sector R&S: Arts & Recreation	111.708 (22) p<.001	.987	.957	.989	.040
Size Differences					
5-9 Employees	86.085 (.18) p<.001	.987	.957	.989	.038
10-19 Employees	89.459 (18) p<.001	.985	.951	.988	.039
20-49 Employees	89.907 (18) p<.001	.984	.948	.987	.039
50-99 Employees	96.994 (18) p<.001	.984	.946	.987	.041
100-250 Employees	101.366 (18) p<.001	.982	.940	.985	.042

- a. Normed Fit Index
- b. Tucker-Lewis Index
- c. Comparative Fit Index

d. Root Mean Square Error of Approximation

Table D.2 Mediation Effects of Management Practices between Skills and Performance

<i>Relationship</i>	<i>Direct Effect without Mediator</i>	<i>Direct Effect with Mediator</i>	<i>Indirect Effects Estimated via Bootstrapping</i>
<i>Leadership on Turnover via Formalised Strategy</i>	<i>-.099 (<.001)</i>	<i>-.091 (<.001)</i>	<i>.003 (p<.05) Significant mediation</i>
<i>Leadership on Turnover via Responsive Strategy</i>	<i>-.099 (<.001)</i>	<i>-.091(<.001)</i>	<i>-.011 (p <.01) Significant mediation</i>
<i>Leadership on Productivity via Formalised Strategy</i>	<i>-.106 (<.001)</i>	<i>-.097 (<.001)</i>	<i>.001 (n.s.) No Mediation</i>
<i>Leadership on Productivity via Responsive Strategy</i>	<i>-.106 (<.001)</i>	<i>-.097(<.001)</i>	<i>-.009 (p<.01) Significant mediation</i>
<i>Entrepreneurship on Turnover via Formalised Strategy</i>	<i>.084 (<.001)</i>	<i>.093(<.001)</i>	<i>.005 (p<.05) Significant mediation</i>
<i>Entrepreneurship on Turnover via Responsive Strategy</i>	<i>.084 (<.001)</i>	<i>.093(<.001)</i>	<i>-.013 (p<.01) Significant mediation</i>
<i>Entrepreneurship on Productivity via Formalised Strategy</i>	<i>.086 (<.001)</i>	<i>.098(<.001)</i>	<i>.002 (n.s.) No Mediation</i>
<i>Entrepreneurship on Productivity via Responsive Strategy</i>	<i>.086 (<.001)</i>	<i>.098(<.001)</i>	<i>-.011 (p<.05) Significant mediation</i>
<i>Formalised Strategy on Growth via HRM</i>	<i>.003 (ns)</i>	<i>.009 (ns)</i>	<i>N.S. No Mediation</i>
<i>Responsive Strategy on Growth via HRM</i>	<i>.047 (<.05)</i>	<i>.052 (<.05)</i>	<i>N.S. No Mediation</i>



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