

# Working Paper Series

## Organizational Learning in Smaller Manufacturing Firms

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**ORGANIZATIONAL LEARNING IN SMALLER  
MANUFACTURING FIRMS**

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**ABSTRACT**

The creation of knowledge through organizational learning processes is argued by many to be one of the most important sources of competitive advantage. The logical extension of this argument is the organizational learning and firm performance should, in some way, be positively associated. However the field of organizational learning and the learning organization is not uncontested and, according to some, is beset by a number of limitations. Principal amongst these is the perception amongst some researchers that there is too great a scarcity of empirical work in field settings, not least because of a paucity of valid and reliable measures to assess the ways in which organizations engage in learning at the collective level. This paper describes the development and validation of a measure that is intended to address this issue. The measure is specifically designed to assess the way in which managers perceive their organizations' orientation to learning in terms of higher-order (active) and lower-order (passive) levels of learning. Data are presented from a number of samples of SMEs in the UK that indicate that the measure exhibits reliability and validity. Furthermore, a number of relationships between organizational learning and financial and non-financial performance were observed. The implications of the findings for the management of learning and knowledge within organizations are discussed.

## INTRODUCTION

Management scholars consider knowledge and the capability to create it through organizational learning to be one of the most important sources of competitive advantage (see for example: Crossan & Guatto, 1996; Nonaka, Toyama & Konno, 2000; Stata, 1989). This level of interest in organizational learning prevalent both amongst scholars and practitioners may be seen as an attempt to theorize ways in which organizational knowledge assets may be created (Nonaka et al, 2000) and to put forward practical ways in which to manage the organizations in which the knowledge assets are created (Pedler, Burgoyne & Boydell, 1997). The argument often put forward is that the knowledge assets and the process by which they are created are a sustainable and non-imitable resource in a business environment in which technologies and products may be readily copied and reproduced (Stata, 1989). The underlying precept of such a stance is that knowledge, and the ways in which it is created and managed, is critical to the success of a firm. Organizational learning is therefore, a potentially useful concept in helping to describe a difficult to emulate resource (the knowledge created) and a difficult to imitate process (the act of knowledge creation).

In highly competitive markets (such as manufacturing), with increased globalization (and the driving down of labor costs), enhanced customer expectations and fierce competition, organizational learning may be considered a core capability of an effective organization and a key element of a strategy for corporate renewal. Barney (1991) noted that sustainable competitive advantage comes from resources or capabilities that are valuable, rare, difficult to imitate and non-substitutable. Through learning firms may expand their knowledge and skill bases (their core capabilities or core competencies) and improve their ability to assimilate and utilize new information (Cohen & Levinthal, 1990; Leonard-Barton, 1992; Schilling, 2002). Learning may be seen as a distinctive meta-competence at the individual and the organizational levels (i.e. learning is an enabling process - individuals and organizations use it to learn other, lower order competencies). By aspiring towards being a learning organization firms may leverage this organizational and human resource (meta) competence (Kamoche, 1999).

The field is, however, not un-problematical. For example Tsang (1997) argued for a clearer distinction to be drawn between organizational learning (which tends to be descriptive and

analytical) and 'the learning organization' (which he argued is prescriptive and action-oriented); moreover, he bemoaned the paucity of descriptive work and the abundance of prescription without 'proper empirical and research support'. King and Anderson (2002: 190) adopt a skeptical tone: "It is likely that some positive studies do exist, but there is clearly a lack of robust research to support the mass of recent consultancy offerings to enhance organizational learning". They recommended caution when interpreting claims about organizational learning but do not discount future research offering more hope in this direction.

## BACKGROUND

Organizational learning may be defined as the development or acquisition of new knowledge or skills in response to internal or external stimuli that leads to a more or less permanent change in collective behavior and that enhances organizational efficiency and / or effectiveness. This definition draws upon a fundamental and long-recognized distinction between two contrasting forms of organizational learning. Argyris and Schon (1978), Senge (1992) and others have distinguished between a lower-order form of learning, referred to variously as single loop learning (Argyris & Schon) or adaptive learning (Senge) versus a higher-order form, referred to as double loop learning (Argyris & Schon) or generative learning (Senge). Lower-order learning is engaging with the demands of the internal or external environment by using or modifying current organizational practices, but leaving basic assumptions about the organization and its environment intact (at best this is learning for efficient operation). Higher-order learning is learning that goes beyond adaptation by questioning current assumptions and developing new insights that may lead to the overhauling of long-held organizational routines and practices. Such learning may be described as learning for *effective* operation. In going beyond the lower-level learning such higher-level processes are assumed in general to be mutually exclusive of their lower-level counterparts.

Organizational routines (regular and predictable behaviors that embed themselves in processes, products and standards of service) are an important aspect of the ways in which learning manifests itself (Kim, 1993) and are at the interface of the trade-off between efficiency and effectiveness. Lower-order learning may facilitate the development of a repertoire of routines that enable highly efficient performance, however in the absence of higher-order learning this may lead to a

lack of flexibility and inability to respond readily to new problems. Starbuck and Hedberg (2001: 338) noted that long-term success might be the enemy of learning in that it may weaken the ability to unlearn radically and reorient strategically; an 'introverted complacency' can result in elaborated and reinforced cognitive structures. Miller (1994) attributed this phenomenon to extreme process orientation, inattention and insularity reinforced by positive feedback. In a learning organization this introverted complacency is subverted through organizational learning processes and which is characterized by: "an organization [that is] skilled at creating, acquiring and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights" (Garvin, 1993). This orientation is, according to Garvin, underpinned by five capabilities: systematic problem solving; experimenting with new approaches; learning from one's own and others' experiences and history; transferring knowledge quickly through the organization. A crucial outcome of the organizational learning process and feature of a learning organization are shared mindsets (Ulrich & Lake, 1990) or shared mental models (Kim, 1993).

An acknowledged shortcoming of much of the research in this field has been the dearth of empirical evidence that can be used to support the assertion that there is positive relationship between organizational learning and business performance. For example, Lahteenmaki, Toivonen & Mattila (2001) argued that whilst there are a number of consulting tools on the market, the lack of available measures represents an important gap in organizational learning research. Tsang (1997) has noted the tendency of the field to over-prescribe theoretically and under-describe empirically. In response to this and other calls for empirically driven work there have been an increasing number of such studies. For example, Ellinger, Yang and Ellinger (2000) in a study of US manufacturing firms presented findings which suggested that the learning organization concept may be positively associated with firm performance and made a plea for further studies using a variety of financial and non-financial indicators of performance.

#### **PURPOSES OF THE RESEARCH**

One of the aims of this paper is to describe the development and validation of a measure which is designed to assess the way in which managers perceive their organizations' proclivity for organizational learning in terms of a higher-order learning / lower order learning distinction (derived from the principles outlined by Garvin

and the theories of Argyris and others - see below). Such an instrument may be of value in that it may enable researchers to explore more readily the relationships between learning and outcomes, as well as providing a valid and reliable organizational audit tool for practitioners. Conceptually the development of the instrument which we are proposing here was informed by the theories of Argyris and Schon (1978) (single loop and double loop learning), Fiol and Lyles (1985) (lower level learning and higher level learning), Senge (1992) (adaptive learning and generative learning), Di Bella, Nevis and Gould (1996) (incremental and transformational learning) and Pedler, Burgoyne and Boydell (1997) (implementing and improving).

Klimecki and Lassleben (1998: 409) described organizational learning as "changes in organizational knowledge that are induced by information processing and enable an organization to find new ways in order to survive and succeed in new situations". One way of drawing a distinction between these different types of organizational learning is by conceptualizing change as occurring to differing degrees (higher order) and at different levels (individual and organizational). As noted a number of authors have drawn a distinction between 'higher-order' and 'lower-order' forms of organizational learning which represent two qualitatively different processes that may be categorized as: (a) *passive orientation*: lower level; single loop; adaptive; incremental; (b) *active orientation*: higher level; double loop; generative; transformational. Senge (1992) described adaptive learning as coping and dealing with the current environment in new and better ways; he described generative learning as moving beyond adaptation and developing new ways of looking at the world and suggests that it is a bi-polar construct with the categories of lower-order learning and higher-order learning being, by definition, mutually exclusive. The aim of this research was to design and validate an instrument for assessing organizations' learning orientations and to explore the relationship between and a range of theoretically related measures (including performance).

#### **METHOD**

##### **Research Instruments**

A total of six instruments was employed in the research and administered to four independent samples of participants (see Participants and Procedure below).

### **Learning Orientation Scale**

We chose to develop our own Learning Orientation Scale rather than use available instruments because: (a) the length of many of them meant that they were not ideally suited for cross-sectional survey research with owner managers in small firms; (b) there is an apparent lack of available reliability and validity data; (c) they tend to have a consulting focus; (d) they are based upon single company case study origins and hence of unknown generalizability; (e) we wanted to develop a measure whose conceptual origins was in the body of literature alluded to earlier.

The nine-item Learning Orientation Scale we developed is shown in Table 1. It was created from an initial item pool consisting of thirty items based upon a conception of the construct of organizational learning informed by extant theory. It was decided to include a balance of lower-order (passive) learning items (for example: 'Employees are discouraged from experimenting with new and novel ways of working') and higher-order (active) learning items (for example: 'Ideas from all employees are listened to and acted on to change company policy even if they challenge senior managers' views'). The lower-order items are indicative of greater routinization of organizational processes and hence less flexibility and adaptability, i.e. a passivity or complacency in learning. The item pool was assessed by a panel of researchers and practitioners for wording, relevance and redundancy and as a result was reduced to twenty items that subsequently formed the pilot version of an instrument that was then tested with a group of thirty managers and reduced further on the basis of an item analysis of mean scores and item-total correlations to thirteen items. In a subsequent factor analysis previously reported (Salder-Smith, Chaston and Spicer, 2001) four items were identified that did not group with the learning orientation items *per se*, and consequently the final version of the scale as reported here comprised nine items. Items were scored on a five point response format from strongly disagree (scored one) to strongly agree (scored five). The lower-order learning items were negatively scored. A total learning orientation score was computed by adding together scores for individual items and dividing by the total number of items (nine), hence a higher score indicated a higher-order (active) learning orientation and vice versa. The Learning Orientation Scale was completed by all four samples (see Procedure and Participants below).

### **Entrepreneurial style**

Theory suggests that higher-order organizational learning is associated with an approach to the processing of information that involves thinking 'outside the box', i.e. beyond existing paradigms in terms of a firm's processes and / or products. This is likely to involve a proactive approach to generating and acquiring new knowledge and may be indicative of openness to experimentation and innovation and a low risk aversion. Hence, a higher-order learning orientation is likely to be associated with an entrepreneurial style of management. Covin and Slevin (1988) devised a six-item entrepreneurial style scale based on previous work by Khandwalla (1973) that aimed to 'assess the entrepreneurial style elements of risk-taking, innovativeness and proactiveness' (p.224). For the research reported here one large firm-specific item from the original scale was omitted. Previous research using this scale has demonstrated satisfactory levels of internal reliability (Cronbach ( $> 0.70$  - see Covin & Slevin, 1988, p.225). Sample 2 completed the entrepreneurial style scale.

*Hypothesis 1:* There will be a positive relationship between the learning orientation scale and entrepreneurial style (H1)

### **Organizational Structure**

A number of organizational theorists and researchers have postulated different organizational structures (for example: Burns & Stalker, 1961) based upon the extent to which an organization is flexible, informal and with situational vested authority (organic structure) as opposed to exercising bureaucracy, rigidity and formality (mechanistic structure). Covin and Slevin (1988) operationalized this concept of organizational structure by using a six-item measure (a higher score indicating a more organic structure). Since the notion of organizational learning is associated with organizational processes such as empowerment, informality, flexibility and knowledge sharing (characteristic of an organic structure), it was hypothesized that there would be a positive correlation between learning orientation and organizational structure (higher-order learning would be associated with a more organic structure). Sample 2 completed the organizational structure scale.

*Hypothesis 2:* There will be a positive relationship between the learning orientation scale and organizational structure (H2)

**Job complexity**

Job complexity may be conceived in terms of the extent to which employees are required to adhere to rigid and repetitive routines (low complexity) versus the extent which they have freedom to exercise judgement, perform a variety of tasks, learn new things and exercise creativity (high complexity). Highly routinized work is less likely to require employees to engage in higher-order learning; whereas complex and varying jobs make more exacting demands upon the variety of skills and behaviors an employee needs to bring to bear upon a task. In order to explore the relationship between learning orientation and job complexity a five-item measure of job complexity scale was used (Price, 1997). Sample 2 completed the job complexity scale.

*Hypothesis 3:* There will be a positive relationship between job complexity and the learning orientation scale (H3).

**Social Desirability**

Social desirability reflects "the tendency on behalf of subjects to deny socially undesirable traits and claim socially desirable ones, and the tendency to say things which place the speaker in a favorable light" (Hederhof, 1985 p. 264). It represents a long standing concern in the evaluation of survey research which, disappointingly fails to receive much attention currently, as this potential for non-random tendency in responses can bias results, and can be an outcome of the design of a survey instrument (Block, 1990). Social desirability is of concern here given the potential desire for respondents to want to place their organization in the best possible light and hence respond positively to the learning orientation scale. Recognizing the potential problem of social desirability in surveys, a number of researchers have developed scales for its assessment. One of the most enduring of these is the Marlowe-Crowne social desirability scale (Crowne & Marlow, 1960, 1964) which has demonstrated satisfactory reliability (Robinson & Shaver 1973, Hederhof, 1985) and for which a number of shortened versions exist. The version employed here is that proposed by Greenwald and Satow (1970) who presented a Likert-scored version of the Marlowe-Crowne social desirability scale and identify a pool of 38 items from which researchers can generate their own instrument with a length appropriate to the scale investigated and study undertaken. Items in the scale contain statements that are either culturally acceptable but probably untrue (positively keyed) and others that are true, but undesirable (negatively keyed).

For the purpose of this study, the three positively keyed and three negatively keyed items with the highest correlations with the total scale score were selected from the pool (as suggested by Greenwald & Satow). These are used to produce a single scale for social desirability, with higher scores indicating greater potential for social desirability in response. Sample 3 completed the social desirability scale.

*Hypothesis 4:* There will be no relationship between social desirability and the learning orientation scale (H4).

**Organizational Performance**

One of the central tenets of organizational learning theory (and especially for the proponents of the 'learning organization' ideal) is that the effective acquisition and utilization of new knowledge at the organizational level is a source of flexibility, adaptability and competitive advantage (Stata, 1989) and hence is likely to be associated with enhanced organizational performance. The notion of organizational performance itself may be conceptualized in a number of different ways. For example, previous researchers in the small firm arena have used market performance (as manifested in changes in sales growth) as a measure of organizational performance. This measure has advantages in that it assesses production for sales rather than for stock and is an index that most owner managers are likely to be able to easily access and be predisposed to disclosing to outsiders. Others have argued that organizational performance is multi-faceted (for example, Venkatraman & Ramanujam, 1986), and that emphases in recent decades on continuous improvement and service quality have highlighted the importance of non-financial performance. Khatri and Ng (2000) used a combination of financial and non-financial measures of firm performance and employed efficiency of operations, public image and good will as indicators of the latter. In order to explore the relationship between learning orientation and performance we used sales growth (per cent change in sales growth over previous 12 months) and Khatri and Ng's non-financial performance measure. The latter is a three-item scale that has previously shown acceptable levels of reliability. The sales growth performance data was elicited from Sample 4; this sample also completed Khatri and Ng's non-financial performance scale. In order to test the relationship with performance we choose to elicit current financial performance data (in July 2000) and we also re-surveyed respondents to identify their subsequent financial

performance two years after the initial survey (in July 2002).

*Hypothesis 5a:* There will be a positive relationship between current financial performance and the learning orientation scale (H5a).

*Hypothesis 5b:* There will be a positive relationship between current non-financial performance and the learning orientation scale (H5b).

*Hypothesis 5c:* There will be a positive relationship between subsequent non-financial performance and the learning orientation scale (H5c).

*Hypothesis 5d:* There will be a positive relationship between subsequent non-financial performance and the learning orientation scale (H5d).

### **Participants and Procedure**

Four separate groups of participants (Samples 1-4) were utilized in the research and the various measures were administered by means of a postal questionnaire survey to the companies concerned, all of who were based in the south west of England. Potential respondents (with the exception of Sample 3) were randomly selected on the basis of sector (manufacturing) and size (less than 250 employees) from a commercially available database. We focused on the manufacturing industry because of the importance of routines (hence this sector would be a potentially useful 'test-bed' for our measure) and to control for any effects of industry sector. The characteristics of the samples were as follows: (a) Sample 1: owner managers in 82 manufacturing firms, median number of employees, 23.5; (b) Sample 2: owner managers 92 manufacturing firms, median number of employees, 27; (c) Sample 3: 20 randomly selected middle managers in a large public sector organization all of who participated in the

**TABLE 1. INDIVIDUAL ITEMS, ITEM-TOTAL CORRELATIONS AND RELIABILITIES (SCALE-IF-ITEM-DELETED) FOR SAMPLE 1 (N = 82) FOR THE LEARNING ORIENTATION SCALE**

<i>Item</i>	<i>Corrected item-total correlation</i>	<i>Cronbach <math>\alpha</math> if item deleted</i>
1. This is an open organization and as much information as possible is made available to employees.	0.61	0.78
2. Ideas from all employees are listened to and acted on to change company policy even if they challenge senior managers' views.	0.38	0.81
3. There is two-way communication between employees of all levels about what this company's doing and where it's going.	0.31	0.81
4. Company strategy and policy are prescribed by senior managers. (negative)	0.60	0.78
5. We actively encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	0.58	0.78
6. We're reluctant to try out new ways of working because we're not the sort of company that can take risks. (negative)	0.59	0.78
7. Employees are discouraged from experimenting with new and novel ways of working. (negative)	0.61	0.78
8. We do have set working practices, but we can change these in pursuit of greater efficiency if need be.	0.40	0.80
9. We promote risk taking and experimentation in our working methods.	0.50	0.79

*Note:* Items 4, 6 and 7 are reverse scored

research on a voluntary basis; (d) Sample 4: owner managers in 91 manufacturing firms, median number of employees, 25. The questionnaire was administered to Sample 4 in two waves three weeks apart during the summer of 2000. The average response rate was 25 percent.

## RESULTS AND DISCUSSION

### Scale Reliability

Individual items, item-total correlations and scale reliabilities (Cronbach  $\alpha$ 's for the deletion of each item in turn) for the learning orientation scale in Sample 1 are shown in Table 1. The overall statistics for the scale were as follows: mean = 3.67 (standard deviation = 0.59); skewness = -0.36; kurtosis = 0.09; Cronbach ( $\alpha$ ) = 0.81. The overall scale reliability is acceptable ( $\alpha > 0.70$ ) as are item-total correlations ( $r > 0.30$ ). Values of skewness are within acceptable limits ( $\pm 1.00$ ) and inspections of the histogram and normal P-P plot revealed scale scores to be normally distributed (Kolmogorov-Smirnov  $Z = 0.58$ ;  $p = 0.58$ ).

### Scale Validity

The results pertaining to Samples 2 and 3 are summarized in Table 2. The Learning Orientation Scale was found to have good reliability, and values of Cronbach ( $\alpha$ ) were in each case in excess of the minimum recommended by Finkelstein (1989) for organizational research. The reliabilities for the other scales used were also in excess of this minimum value with the exception of the short form of the Marlowe-Crowne social desirability scale (Cronbach  $\alpha = 0.55$ ). As expected the Learning Orientation Scale showed statistically significant positive correlations with entrepreneurial style, and job complexity, thus supporting Hypotheses 1 and 3 respectively. The expected correlation with organizational structure was not observed; hence Hypothesis 2 was not supported. The correlation of the Learning Orientation Scale with social desirability was non-significant

( $p = 0.540$ ) thus supporting Hypothesis 4.

### Relationship with Performance

Sample 4 was used to explore the relationship between organizational learning and performance. The internal consistency for the non-financial performance measure devised by Khatri and Ng (2000) was satisfactory (Cronbach  $\alpha = 0.82$ ). There were no statistically significant differences between respondents in the first wave and those in the second wave with respect to organizational learning or performance ( $t_{89} < 2.00$ ;  $p > 0.05$ ). In order to test Hypotheses 5a and 5b the two current performance measures were regressed separately on learning orientation with size and number of years trading ( $\log_{10}$ ) as control variables. The inter-correlation of the two performance measures was statistically significant but low ( $r = 0.21$ ;  $p < 0.05$ ). Those firms whose increase in sales growth could have been attributable to a merger or acquisition were excluded from the analysis of financial performance ( $N = 80$ ). Zero-order correlations between organizational learning and the other two independent variables (size and age of firm) were low and non-significant. As may be seen from Table 3 the number of years the businesses had been trading showed a negative relationship with financial performance ( $p = 0.003$ ). This finding, that younger firms showed higher rates of sales growth, is commensurate with life cycle theories in which the early development stage of a firm's life is characterized by a comparatively rapid growth in sales revenue (Smallbone & Wyer, 2000). Learning orientation showed a positive relationship with financial performance ( $p = 0.053$ ) thus supporting Hypothesis 5a and was also positively related to non-financial performance ( $p = 0.002$ ) supporting Hypothesis 5b.

In order to overcome some of the limitations of cross sectional research and to explore the

TABLE 2. RELIABILITY COEFFICIENTS AND CORRELATIONS WITH LEARNING ORIENTATION SCALE

Sample	Scale	N	Number of items	$\alpha$	Correlation with learning orientation
2	Learning orientation		9	0.73	
	Entrepreneurial style	92	5	0.86	0.23*
	Organizational structure	92	6	0.60	0.09
	Job complexity	92	5	0.75	0.24*
3	Learning orientation		9	0.64	
	Social desirability	20	6	0.55	-0.14

Notes: \*  $p < 0.05$  (2-tailed)

TABLE 3. RESULTS OF REGRESSION ANALYSIS

Independent Variable	Performance	
	Financial	Non-financial
Size (log <sub>10</sub> )	0.50	-1.16
Years trading (log10)	-3.11 **	-0.70
Organizational learning	1.96†	3.20**
Model F	4.60	4.33**
R <sup>2</sup>	0.15	0.13

Notes: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ ; †  $p < 0.10$  (2-tailed)

relationship between learning orientation and financial performance over the longer term Sample 4 participants were re-mailed in July 2002 two years after the original survey (July 2000). After two mailings a total of 23 usable survey forms were obtained (a response rate of 25 per cent based on the 91 participants who comprised Sample 4). The median number of employees for this sub-sample was 23. There were no statistically significant differences between the sub-sample and Sample 4 with respect to size. Furthermore, the differences were non-significant between the sub-sample and Sample 4 in terms of sales growth ( $t = -1.31$ ;  $df = 22$ ;  $p = 0.204$ ) and learning orientation ( $t = 0.68$ ;  $df = 23$ ;  $p = 0.502$ ). The internal consistency for the learning orientation scale was satisfactory (Cronbach  $\alpha = 0.75$ ) and the correlation between learning orientation in 2000 and that in 2002 was non-significant ( $r = 0.19$ ;  $p = 0.381$ )<sup>1</sup>. The internal consistency for the non-financial performance scale was 0.61 (Cronbach  $\alpha$ ). Correlations between learning orientation and performance were computed (in the case of financial performance the effect of years trading was controlled for in the computation). As well as the measures of organizational learning and performance gathered in July 2002 the means for each of these over the period 2000-2002 also

were computed and included in the correlational analysis (Table 4).

As may be seen from the table there were no statistically significant correlations between learning orientation in 2000 and financial or non-financial performance in July 2002. The correlation between learning orientation in 2000 and overall financial performance (2000-2002) was statistically significant ( $p = 0.059$ ). The contemporaneous relationship between learning orientation and non-financial performance in 2002 was statistically significant ( $p = 0.012$ ). The correlations between overall performance and mean learning orientation over the two-year period were both statistically significant ( $0.036 \leq p \leq 0.037$ ). These results provide qualified support for Hypothesis 5c.

#### IMPLICATIONS

Critics have argued that previous research in the field of organizational learning and the learning organization has tended to be normative (based on an assumption that learning leads to enhanced performance) and prescriptive (based upon the recommendation that adherence to prescribed behaviors can bring about learning). Some have identified this propensity towards prescription before description as a weakness of the field (Tsang, 1997). A number of authors have

TABLE 4. CORRELATIONS WITH SUBSEQUENT AND OVERALL PERFORMANCE

Performance	Learning orientation		
	2000	2002	Mean (2000-2002)
Financial performance July 2002a	0.17	0.25	0.27
Non-financial performance July 2002	-0.11	0.47*	0.24
Overall financial performance (July 2000-2002) <sup>a</sup>	0.34†	-	0.39*
Overall non-financial performance (July 2000-2002)	0.15	-	0.38*

Notes:  $N = 23$ ; a partial correlations controlling for the number of years the business had been trading; \*  $p < 0.05$ ; †  $p < 0.10$  (1-tailed)

<sup>1</sup> The measure has previously demonstrated satisfactory test-retest reliability over a three-year period (see Salder-Smith et al, 2001).

produced instruments and consultancy tools that aim to assess particular aspects of learning, however some of these appear to have limitations from a research perspective, for example lack of publicly available data relating to the reliability and validity of their constituent scales. More recently scholars have focused increased attention on measurement issues by employing conventional scale development approaches and techniques (for example: Lahteenmaki, Toivonen & Mattila, 2001). This paper has reported the development of one such measure that has shown acceptable levels of reliability and revealed initial evidence of construct validity through psychometric analyses and observed relationships with theoretically related variables. The compactness of the instrument means that it may be easily used in large-scale investigations in field settings and also can be combined with other measures in order to test some of the organizational learning precepts held by scholars and practitioners.

Further research might usefully examine the instrument's validity in a wider range of contexts and levels. (Questions include its usefulness at the multi-level of analysis (as opposed to the individual level employed here), and its relationships with related measures. Other issues include the relationship between organizational learning and business sector, the impact over time of a particular learning orientation, the ways in which learning orientation may change in response to various stimuli, and the interaction between organizational learning orientations and the business environment.

There are a number of implications of this research for management practice. There were associations between organizational learning and performance though the amount of variance accounted for was low. It adds some support to the view that learning and performance are related but clearly there are aspects of the research design that militate against inferring causality in a simplistic manner. As well as being associated with financial performance, learning orientation also was associated with non-financial performance in terms of efficiency of operations, public image and good will. Again causality is problematical, but nonetheless organizational learning appears to show some relationships with two measures of organizational performance. Together these results build a stronger case for the learning-performance relationship than either alone, though further research is required to explore the strength of these relationships. If the

causality is in the direction from learning to performance there are likely to be benefits to organizations of adopting an 'active' as opposed to 'passive' learning orientation. Becoming more aware of and responding to customers' needs, listening to employees and reviewing and revising organizational routines at the organizational level are ways of learning collectively from experiences and thus continuously improving the efficiency and effectiveness of a firm's operations.

## CONCLUSION

An active learning orientation is one way of creating the right conditions for the generation of knowledge, recognized for over a century as "the most powerful engine of production" (Marshall, 1890). Such an orientation might comprise a number of underlying principles. Firstly, systems and processes should facilitate the free flow of information and knowledge between different communities. These may counteract redundancy of effort and also contribute to the development of the 'shared mindsets' referred to by Ulrich and Lake (1990). Such systems are also likely to require a formal architecture comprising translation (the framing of the interests of one community in terms of another's perspective), brokering (the brokering of knowledge by one who participates in the practices of several communities) and boundary objects (objects of interest to each community but used or viewed differently by each) (Seely Brown & Duguid, 1998). Secondly, a learning orientation is characterized by a culture in which organizational procedures, routines, scripts and norms are open to challenge and reinterpretation. Routines and scripts become institutionalized through their repetitive use and may decrease behavioral flexibility (Wright & Snell, 1999). One way of increasing the behavioral repertoires available to employees is through developmental experiences such as action learning (Revans, 1971) that expose individuals to a wider range of routines, scripts and norms.

Alongside the notion of the challenging of routines, scripts and norms comes the expectation that risk-taking and experimentation will be acceptable behaviors. It should be recognized however, that experimentation and risk taking are likely to be somewhat context-dependent, and particular types of learning may be better practiced in artificial as opposed to real situations, thus avoiding the temptation to, as Shell's Arie de Geus has described it, 'experiment with reality'. Thirdly, within an active learning orientation strategy is seen as a 'bottom-up' as well as 'top-

down' process, again with implications for employee participation and involvement. Such an approach requires a participative infrastructure (Wright & Snell, 1999) in identifying, developing and exploiting emergent strategies. Finally, the opportunity to reflect upon and learn from experiences, including those that failed as well as those that were successful, is an invaluable source of contextualized knowledge or 'experiential wisdom' (Levitt & March, 1996).

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