Technological and organisational change in small- to medium-sized manufacturing companies: A learning organisation perspective


Abstract:

This paper examines the extent to which a learning organization perspective is attainable in small- to medium-sized manufacturing companies. An audit tool is developed from the literature on organizational learning and recognized processes that lead towards becoming a learning organization. The paper focuses on the application of the audit tool in three UK automotive component suppliers which are all experiencing pressures for change imposed by the major vehicle manufacturers. The main changes are concerned with tiering of the supply chain and substantial delegation of responsibilities to component suppliers including an increasing emphasis on innovation and continuous improvement. The companies presented in the paper are taken from a research project into the impact of changes in supply chain relationships on the operation of small- and medium-sized manufacturing firms in the West Midlands region of the UK. The ways in which the companies are responding to change are presented together with the results of a self-assessment using the developed audit tool.

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Introduction

The concept of the learning organisation is one that has been pursued extensively in the organisation studies literature, whereas in the field of manufacturing and operations management
it has received relatively less attention. Among those that have recognised its importance in manufacturing are Hayes, Wheelwright and Clark who gave the subtitle Creating the Learning Organization to their influential book Dynamic Manufacturing (Hayes et al., 1988). Although on closer examination of this text they give only limited consideration to the nature of learning within manufacturing and the practical means whereby learning can be achieved. Rather, they say simply: "Long-term success is not the same as simple survival - increasingly difficult though that may be. It requires an organisation that can build and continually renew its competitiveness in all functions, not just manufacturing. It means creating and sustaining the learning organization."

Leonard-Barton, on the other hand, does take the concept forward within a manufacturing context by considering some of the specific measures that a manufacturing company can take in seeking to develop a climate for organisational learning. However, these are largely based on the experiences of only one case company, Chaparral Steel (Leonard-Barton, 1992).

For smaller companies in the manufacturing sector, therefore, there is little evidence that they can use to provide lessons about implementing the practical aspects of organisational learning within their operations. The purpose of this paper is to address this question by considering the experiences of three small- to medium-sized companies in the supply sector of the UK automotive industry. It reviews the literature on how learning can provide a route to organisational and technical change and examines the context of change in the UK automotive supply sector. Three case companies are analysed using an audit tool specifically designed to measure the level of adoption of eight characteristics of learning organisations, which are particularly appropriate for the context of smaller firms. These characteristics are described, scaled and compared for the companies. The results provide an insight into how small- to medium-sized component suppliers are attempting to be responsive to change by adapting and adopting many of the characteristics that the literature associates with learning organisations. Although none of the companies explicitly set out to create a learning organisation the pressure for improvement and innovation in these companies is such that they have attempted to approximate "best practice" through their own internal development programmes and the establishment of a regional network of similar sized sector companies.

Organisational learning and the learning organisation as a route to technological and organisational change

Organisational learning as a process and the learning organisation as a certain type of organisation have been the subject of a steadily growing body of literature since the 1980s. These writings have been described as falling into two streams of theorising, the one which is prescriptive and based upon consultancy experience, whilst the other is descriptive based upon empirical research. The former faces criticism for over-generalising by prescribing "one right way" and thus lacking sensitivity to the implications of different organisational settings. The latter much smaller group, whilst recognising the limitations of their findings, can nevertheless be criticised for failing to produce outcomes in a form which might be useful to practising managers (Tsang, 1997).

Interest among researchers, consultants and managers in the process of organisational learning and the development of learning organisations has arisen because of the increasingly unstable environment in which organisations operate. Under more stable economic and technological conditions, bureaucratic principles enabled many organisations to function effectively but globalisation, the restructuring of industries and the impact of information technology has created a market place which requires organisations to learn to operate in ways quite outside their previous experience.

Learning in organisations has traditionally been equated with the activities of a training department, concerned with the enhancement of individual skills. The changing world of industry requires a very different approach to learning, which encompasses the whole organisation. Baldwin et al. graphically depict the situation: "when the business environment becomes murky and the strategic horizon of an organisation shrinks from 25 years to ten or five or even two years, then all individuals in an organisation have to become externally focused - exploring, probing and investigating the boundaries of the known much like a CEO" (Baldwin et al., 1997).
Thus, the facilitation of learning throughout the organisations becomes a key element in organisational change, rather than simply viewing training as a somewhat peripheral, limited, and at times easily neglected, activity.

Various authors have distinguished between organisational learning and the learning organisation. For instance DiBella simply depicts organisational learning as "something that takes place in organisations, whereas 'the learning organisation' is a particular type or form of organisation in and of itself" (DiBella, 1995). Jones and Hendry (1994) on the other hand see the distinction as more complex, as the emphasis on human resource management, training, knowledge and skills acquisition tends to obscure the real issues behind the learning organisation. They point to the contribution of Argyris and Schon (1978) on ways in which individual learning in organisations could be harnessed to produce collective or organisational learning with the transition from single-loop to double-loop learning. Even so, they point out that this does not capture the essence of a learning organisation for a number of reasons. For instance there are the implications of the concept of organisational capability (Pettigrew and Whipp, 1991) which is not just about hidden or experiential learning and tacit knowledge, with organisations working in unison, changing values and mental models but also about expanding and building on what yet remains underdeveloped. Jones and Hendry see the idea of a learning organisation as essentially a direction or goal, whereas organisational learning can explain and quantify the activities and events which are taking place within such organisations. They call for a better understanding of what is actually taking place within organisations and the interdependent contexts that encourage and produce learning, so that organisations can change and transform themselves, creating a vision of an idealised state to aim for (Jones and Hendry, 1994).

The path to becoming a learning organisation, however, is not easy or necessarily linear and it requires an understanding of how learning takes place within organisations. Essentially learning occurs through individuals but organisational learning is not just the sum of the knowledge acquisition of isolated individuals. Leonard-Barton (1992), for instance, demonstrates how an organisation becomes a learning laboratory through the impact of managerial practices and underlying values in an organisation, on the knowledge and skill embedded in physical equipment, processes and people. Bessant and Buckingham (1993) take the Argyris and Schon (1978) notion of single and double loop learning and show how technological innovation in the form of implementing CAPM (computer-aided production management) systems takes place. This is as a result of moving beyond what Senge (1990) has distinguished as adaptive learning, which comes more naturally to people, to generative learning, which requires new ways of looking at the world. The approach is seen as developing new capabilities with which to face such challenges in the future, but this requires conscious and sustained effort through a participative style of management.

A better appreciation of the process of knowledge acquisition and innovation is part of the quest to understand how organisations learn. For instance Nonaka has based much of his work on knowledge creation and organisational learning on the experiences of Japanese firms. He sees the centre piece of the Japanese approach, as the recognition that a company is not a machine but a living organism and creating new knowledge is not simply a matter of processing objective information (Nonaka, 1996). He compares the ways in which Western managers are more concerned with quantifiable knowledge, seeing their organisations as machines for information processing. In contrast, Japanese managers also recognise the value of "softer" elements of knowledge which cannot be quantified, like employees' insights and tacit knowledge, which are embedded in slogans, metaphors and symbols (Nonaka, 1991a).

Nonaka also argues that information redundancy is a key to knowledge creation. Information is in excess if it is not essential for efficient information processing. If it is shared, this can increase the reliability of knowledge and induce the expansion of requisite knowledge, by stimulating the creative powers of information by generating new meaning. He illustrates how this occurs within and between groups in Japanese companies but also warns of the associated dangers of exhaustion arising from the dynamism of the social interaction. Also "group think" can occur, if the time deadline for innovation is very tight (Nonaka, 1990).
Organisations then are essentially settings in which learning can occur but certain types of systems and structures create more propitious environments. Tyre and Von Hippel (1997) see adaptive learning with the implementation of new technologies as a situated process, with different organisational settings facilitating the learning that takes place between individuals.

All organisations, especially those involved in large scale administrative tasks or manufacturing, require some measure of formalisation of processes and procedures, in order for people to understand their role within the organisation but bureaucracy has often been depicted as a system that inhibits innovative learning and change. Adler and Borys (1996) however, distinguish between two types of formalisation, enabling and coercive, which have either a positive or a negative impact upon employee attitudes and their mastery of tasks. They illustrate how an enabling approach can help employees to interact creatively within the wider organisation and with their environment. They argue that pressures to improve performance have led many firms to use more advanced automation, coupled with increased skill and discretion in the ways in which people can work, with procedures that empower users. This suggests that formalisation need not in itself inhibit the process of organisational learning but rather it depends on the ways in which it is applied within organisations.

Learning does not take place solely within groups or networks of groups within an organisation, as the process can be enhanced through interaction with other organisations. This may occur for instance in the context of the supply chain, whereby a company collaborates with its suppliers to create a network of learning to encourage best practice, process and performance (MacDuffie and Helper, 1997). Studying the experiences of such a programme at Honda, MacDuffie and Helper cite the importance of high motivation for learning and high trust between the parties, if there is to be a transfer of a complicated and largely tacit body of knowledge like lean production. Another example of the effectiveness of learning networks is provided by Powell et al. (1996) in their study of the biotechnology industry. They argue that in the field of rapid technological development like biotechnology, innovation relies upon networks within and between organisations in that community, due to the opportunities that these provide for reciprocal learning.

The importance of the role of leadership in organisational learning and innovation has been widely recognised but the form it should take has been a matter of debate. Nonaka sees a leader as providing a catalyst and acting as a facilitator rather than as the person who is all-knowing. This facilitates the ripple effects of innovations, which will assist firms to renew themselves (Nonaka, 1991b). A typology of leaders in learning organisations by Senge (1996) acknowledges that although there have long been elements in organisations of the leader roles of designer, teacher and steward, these critical roles take on new meaning in building learning organisations. The designer role involves creating a foundation of purpose and core values within the organisation. The teacher role is concerned with helping everyone including him/herself to gain insight into the current reality of the firm. The steward role is about being aware and accepting responsibility for the impact of changes on everyone in the organisation, as well as personal commitment towards the firm's larger mission.

Senge also distinguishes other types of leader in learning organisations. For instance, committed local line leaders can start off the process by creating distinctive sub-cultures within which it is possible to test whether new learning capabilities lead to improved business. Executive leaders have a complementary role to local line managers, by helping to develop learning infrastructures which will help to build the norms and behaviours of a learning culture. Those who achieve this have been prepared to diffuse power through the organisation, rather than defend the traditional authoritarian basis of power. Senge also points to the importance of internal networkers, whose leadership role he sees as the least appreciated. These people do not have formal power but they are able to move freely within the organisation and work with people like local line managers to diffuse new learning (Senge, 1996).

The action learning approach pioneered by Revans (1982) has throughout its history also emphasised the importance of the empowerment of individuals to take action, in order for effective learning to take place within organisations. Limerick et al. (1994) contrast such
organisational development approaches with the role ascribed to leaders in the transformational change literature, which points to the importance of strong leaders to build shared visions and facilitating processes. They conclude that although vision can come from anywhere within the organisation, this does not negate the contribution of the kind of top leader who is concerned with building a shared vision, empowering people, inspiring commitment and ensuring learning processes prevail within their organisation.

Another perspective on the process of organisational learning as a system involves introducing models of the stages of learning within organisations. For instance Nevis et al. (1995) suggest three stages of learning: knowledge acquisition, knowledge sharing and knowledge utilisation but they point out that organisational learning does not always occur in such a linear way. They offer a model distinguishing elements of learning orientation which defines an organisation's learning style and the facilitating factors which are the structures and processes influencing how easy or hard it is for effective learning to take place. Nonaka sees the creation of organisational knowledge arising from the continuous dialogue between tacit and explicit knowledge. This is seen as a spiralling process, with the dialogue starting from tacit to tacit knowledge, then from explicit to explicit knowledge, thirdly from tacit to explicit knowledge and fourthly from explicit to tacit knowledge, so that it crystallises as part of the knowledge system of an organisation (Nonaka, 1996).

The quality movement and its emphasis upon continuous improvement has also been related to organisational learning. For instance, Senge (1992) argues that learning organisations evolve through a series of waves of quality. The primary focus of change in the first wave is frontline workers, with management championing continuous improvement, removing impediments and supporting new practices. In the second wave the focus is on how people work, fostering new ways of thinking and interacting conducive to continual learning. With the third wave of quality this approach to learning is institutionalised within the working life of workers and managers. The reliance on a philosophy of continuous learning however may not be sufficient for firms facing new challenges. Gaining competitive advantage can require creating new mind sets through innovation, rather than simply doing better what an organisation has always done (Starkey, 1996).

DiBella (1995) sees the different types of stage approach, which are often adopted by organisational development consultants, as a normative perspective on change, since it is prescriptive, distinguishing one correct route for organisational learning, on the path to becoming a learning organisation. An alternative perspective is identified as developmental, whereby the organisational system and its learning processes are seen as developing by evolutionary and/or revolutionary means, in a specific or a general direction, towards an eventual stage of maximum adaptability or self-renewal. DiBella also posits a third capability perspective, which legitimates a pluralistic view towards learning and learning styles that can differ between and within different parts of an organisation. The issue here is whether learning styles conflict or complement each other. Although the latter two perspectives can provide a deeper understanding of what is taking place within organisations, as an intervention tool, DiBella suggests that the normative perspective is most effective when immediate action is needed, as it affirms the legitimacy of change.

Whichever approach is adopted as a path to changing the ways in which an organisation operates, organisational learning is an integral part of the change process. To this extent, organisational development interventions based around the goal of becoming a learning organisation are essentially another type of intervention but one with a human centred approach, with less emphasis upon the technical aspects of change. Organisations typically develop the following elements as they move through the process of organisational learning:

- a shared vision and understanding of the direction in which organisations are trying to move (Pettigrew and Whipp, 1991; Jones and Hendry, 1994; DiBella, 1995);
- the facilitation of groups interacting to create new organisational knowledge (Nonaka, 1990; Leonard-Barton, 1992; Senge, 1992; Bessant and Buckingham, 1993);
- a readiness to push beyond accepted boundaries and conventional ways of working (Nonaka, 1996; Senge, 1996; Starkey, 1996; Baldwin et al., 1997);

- an enabling and facilitating leadership to encourage learning (Nonaka, 1991b; Limerick, 1994; Adler and Borys, 1996; Senge, 1996);

- a clear recognition of the importance of learning from the past and of tacit knowledge (Nonaka, 1991a; Pettigrew and Whipp, 1991).

- the importance of learning through collaboration with others including other organisations (Powell et al., 1996; MacDuffie and Helper, 1997; Tyre and Von Hippel, 1997).

The context for change in the automotive supply sector

The automotive sector, particularly in the UK, provides a fruitful context in which to study the adoption of learning organisation concepts, since it exhibits a dynamic interaction between technology, social organisation of work and human competence. Also the motor vehicle has made a fundamental impact on modern life by changing the way people work and live.

Hodgson describes the way in which during the period between 1880 and 1908, the dominant form of motor vehicle production was based on a system regarded as "craft production" that had developed in Europe following the industrial revolution. Motor vehicles produced during these times were the product of skilled workers using flexible multi-purpose tools and the process of building a motor vehicle was customised to meet individual requirements (Hodgson, 1995).

However in 1909 Henry Ford, in setting out to make a simpler and cheaper car, fundamentally changed the way in which cars were built. The organisation and layout of Ford's factories were strongly influenced by the efficiency expert Frederick Taylor who divided production into simple repetitive tasks removing the need for skilled craftsmen (Ford, 1923). By the 1930s, the far-reaching influence of the US vehicle assemblers had reached Europe with the first signs of the adoption of the mass production system. However, as European factories became geared up to producing large volumes of low variety, low cost products they became inflexible and lost the capability to respond to rapid changes in market conditions.

As long as the mass production paradigm was widely adopted by automotive manufacturers there was not a problem. However, from the late 1950s onwards it became evident that the Japanese were developing their own paradigm. Initially referred to as just-in-time manufacturing (Monden, 1994) and later known as lean production, this alternative paradigm was so called since it required less of everything to build a car including material, manpower and time (Womack et al., 1990). The most influential factors in the development of lean production at the time were the restrictions on foreign investment in Japan, pressure to make efficient use of resources and an emphasis on market driven product variety. A combination of these factors and a realisation that mass production was ill matched to product differentiation provided the context which led to lean production (Lamming, 1993). The success of lean production has made a major impact on companies' thinking. It emphasises the significance of supply chain relationships to reduce manufacturing and new product lead times and a smaller component supplier base, backed up by human resource policies which encourage a sense of obligation to the company and delegation of responsibility to teams and individuals (Oliver et al., 1995).

Since organisations have been searching for ways to compete effectively in a turbulent market place various templates of change have been propounded like: world class manufacturing; total quality management; and business process re-engineering as the path to competitiveness in a rapidly changing market environment (Lee and Oakes, 1996). Agile manufacturing is another template to emerge which stresses the importance of fast innovation and ceaseless technological change in order to sustain a competitive position (Kidd, 1994; Katayama and Bennett, 1999).

Regardless of which paradigm is adopted, the key question for manufacturing enterprises is how to effect the transition since there is no single blueprint available to define the new configurations required. Nevertheless, certain themes have gained prominence. For instance it is argued that within the supply chain, to be competitive, component suppliers need to possess the
technological competencies to undertake both product innovation and process innovation, as well as the learning abilities which will lead to the embedding of innovative behaviour within the organisation. This means thinking differently about the role and competencies of the workforce, investing in people and developing cultures for continuous learning (Nyhan, 1996). The ability to use information and transform it into knowledge is an essential part of this innovative process. Organisations attempting to implement lean production or agile manufacturing paradigms cannot achieve this overnight. They need constantly to learn from their own ideas and those of others whilst being responsive to a continually changing environment.

The drivers for organisational learning in the automotive sector

While the automotive industry has undergone a radical restructuring during the last decade, including the provision of just-in-time delivery and continuous price reductions (Womack et al., 1990), the predominant driving force behind most of the changes affecting the larger automotive components companies during the latter part of the 1990s has been the shift towards globalisation by the vehicle manufacturers (VMs). This has been fuelled by the desire of the VMs to sell similar products throughout the world, remove or transfer excess capacity when necessary and accommodate sudden changes in market demand (Czinkota et al., 1998; Carraro, 1997).

By the year 2005, it is estimated that whilst vehicle demand in the domestic markets of North America and Europe is expected to increase by an average of only 10 per cent, the demand in the world's developing regions will grow rapidly. Total demand (cars and commercial vehicles) is expected to rise by 28 per cent in Africa, 41 per cent in South America, 44 per cent in Eastern Europe, 44 per cent in China and up to 47 per cent in India. While these increases will have varied effects on vehicle manufacturers, the globalisation of the demand has seen an increase in activity by many vehicle manufacturers in these developing markets (Wilson, 1998).

Major automotive component suppliers have been forced to follow suit and invest in countries where their customers have set up manufacturing facilities. With the expectation that a limited number of global super-suppliers may dominate the automotive components market in the future, there has been a race for internationalisation amongst the larger components suppliers and an emphasis on supporting the vehicle manufacturers globally (Tilson, 1999). Consequently, the last two years has seen a number of mergers, take-overs and alliances that have greatly affected the structure and characteristics of the automotive sector.

Embarking on such a strategy will mean that the future success of the components suppliers will be tied to the fortunes of the vehicle manufacturers as they seek to respond to the changing demands of globalisation. For example, major components suppliers will be expected to go where their customers relocate and provide facilities that are the most suitable for that region. One of the earliest examples of this trend was the VW-owned Skoda plant in Czechoslovakia and the VW truck plant in Brazil where suppliers are expected to establish their own factory on the same site and supply components trackside (Whitbread, 1998; Marx et al., 1997).

Such demands by the vehicle manufacturers have led to substantial changes in the strategic direction of many of the component manufacturers. Faced with the knowledge that the components sector of the future will almost certainly be made up of a much smaller number of key suppliers in each segment, component manufacturers have been forced to examine their own organisations to make sure they are prepared for such changes. The result has been a restructuring of global parts operations. For example, in return for offering large, longer-term contracts, the vehicle manufacturers expect even higher levels of service such as zero defects, just-in-time delivery etc. and reduced prices. It is now common for contracts to specify a guaranteed annual reduction in price over the life of the contract.

This "sub-contracting" of non-core activities down the supply chain by the vehicle manufacturers has led to a concentration of supplier companies into a number of tiers. Such a move should be beneficial for both the vehicle manufacturers and the component suppliers. At the highest level (first-tier) are those companies, mentioned above, which have the closest relationship with the vehicle manufacturers. However, as mentioned earlier, the number of suppliers in this tier will most likely reduce as the vehicle manufacturers reduce the number of
vendors they deal with to a small network of “super suppliers” (possibly 15 to 20). This will invariably lead to some current first-tier suppliers being forced to relocate at the second-tier level due to insufficient size, resources and technical expertise to maintain a global presence. Nevertheless, second and third-tier suppliers will still perform vital roles, albeit at a regional level.

Those companies wishing to remain competitive need to be highly efficient and capable of supplying a complete systems capability within their specialised fields (Van Hoek and Weken, 1998). Accordingly it has become clear that efficient and cost effective production can only be achieved by concentrating on and fully exploiting areas of real strength and the supply of a broad range of parts is no longer appropriate. Such developments have been evident both with the freeing of vehicle manufacturer owned components suppliers to develop business elsewhere (e.g. Visteon, Delphi) and first-tier conglomerates divesting themselves of non-core businesses.

However, since most resources in a company are transferable and accessible by competitors (e.g. capital, raw materials, standard technologies), competitive advantage derives from the knowledge and abilities of the workforce. As more companies consider higher levels of worker competence as being key to flexibility and competitive advantage, competence development becomes a more strategic issue. Companies can no longer base their strategy on products or markets alone, but also on competencies that provide competitive advantage and cannot easily be copied. As a result, the idea of organisational learning is now permeating the automotive supply chains of vehicle manufacturers, influencing the operations of small- and medium-sized enterprises. Consequently, there is now relevance in investigating the extent to which smaller automotive component suppliers appear to display some of the characteristics of learning organisations.

The learning organisation has been propounded to help companies adapt to change and provide a competitive advantage and is useful in that it recognises that there is no one right way for all organisations. It is easy to write about team working, systemic thinking and continuous improvement etc. However, in long established smaller firms it can be very difficult to understand how to bring these ideas to reality.

The challenge to innovate in smaller firms

Traditionally, there has been a range of explanations for the existence and survival of smaller firms in the manufacturing sector. However, a simple dichotomy can be made between cost based explanations in which smaller firms are able to maintain low manufacturing costs through optimum scales of production and those which emphasise specialisation where products are increasingly more sophisticated and customised to meet segmented market needs.

Firms that operate in segmented markets are more likely to depend on a small number of key customers than those that operate in more open markets where products are less distinctive. A survey carried out in 1990 by the Cambridge Small Business Research Centre revealed that one in three firms relied on one customer for 25 per cent or more of their sales (Cambridge Small Business Research Centre, 1992). Such findings are representative of many component suppliers to the UK automotive industry.

Due to global competition, there is pressure on vehicle manufacturers to reduce costs and more design and development activities are being outsourced. As previously identified, such changes are resulting in the emergence of a tiered supply chain where first-tier companies grow in size and develop the capability to supply systems rather than individual components. However, further down the supply chain, smaller component suppliers have to demonstrate that they too have the technical capability to provide customised products at the lowest cost and appropriate quality. Key to this is the effective adoption of both product and process innovation by the smaller component suppliers.

While a range of descriptions are available for the various types of innovations, in this context the term “innovation” means new product development or the introduction of a significantly improved production method. With the commonly held view that innovation is a precondition for success in this industry, greater attention is now being paid to the performance of the smaller, lower tier, component suppliers regarding innovation.
In the context of learning, core competencies reflect the collective learning of a company that enables it to deliver successfully its core activities. In order to improve competitiveness, vehicle manufacturers are turning back to their core activities in design and production and non-core activities are being pushed down the supply chain. This means that the core competencies on which smaller firms had built their businesses are no longer sufficient as a basis for growth or even survival. While on the one hand the vehicle manufacturers, with all their resources, are concentrating on becoming more specialised the smaller component suppliers are having to diversify into activities not previously undertaken. To satisfy their current customers, such companies not only have to enhance their design and development capabilities by offering a more complex range of products, but they also have to improve their designs in order to reduce manufacturing costs. To achieve this, new core competencies are demanded requiring a longer term planning horizon than is characteristic of these companies, which traditionally have been reactive and adaptive.

Numerous barriers to innovation exist in the smaller component suppliers. Internally these can include attitudes, perceptions and resource constraints. Externally there can be a lack of interaction with outside agencies to facilitate technological transfer or renewal. Developing competencies and learning can arise through internal development programmes and/or externally through recruitment of staff.

Methodology

The study reported here examines the extent to which some of the characteristics of organisational learning have been adopted by three small- to medium-sized component supply companies. The companies are taken from a project into the impact of changes in supply chain relationships on the operation of smaller manufacturing firms in the West Midlands region of the UK. One element of the research project has been the shadowing of a target group of some ten manufacturing companies over a three-year period. During that time, the companies have formed a “best practice” network, which provides an opportunity for company personnel to meet on a monthly basis and exchange ideas and experience. The target group has been studied longitudinally with case material built up on each firm through interviews with senior management, observations undertaken at the companies and involvement in the monthly network meetings. A fuller description of the research project can be found in Oakes and Lee (1999).

In order to explore the ways in which individual companies are attempting to become more competitive, an audit tool has been developed which draws upon insights from the organisational learning literature. Eight characteristics of organisational learning which are particularly appropriate to the smaller firm situation have been identified following discussions with Weaving[1]. These are:

1. Shared mental models: where leaders encourage a shared vision and understanding of the direction in which the organisation is trying to move and the environment in which this is taking place.

2. Learning values: the company supports key values associated with learning and encourages groups interacting to create new organisational learning. People feel free to challenge the opinions of others even if they are more senior and personal responsibility and respect for others is part of the culture.

3. Experimentation and innovation: which reflect the readiness of companies to push beyond accepted boundaries and conventional ways of working. Systems and processes tap originality and creativity from employees and risk taking is encouraged but skilfully managed.

4. Legitimate politics: where an enabling and facilitating leadership is willing to see power and authority widely dispersed, reaching decisions through negotiation and collaboration. People are allowed to pursue their own goals and interests but management ensures that these are aligned with the needs of the business.

5. Learning from the past: the importance of learning from the past and tacit knowledge is recognised. Co-operative problem solving is encouraged, past decisions are recorded and
evaluated, measures are put in place to monitor results and guide future action and feedback sought and applied for continuous improvement.

(6) Synthesising perspectives: the importance of learning through others is recognised, the views of others are actively sought and people are willing and able to adopt alternative perspectives.

(7) Commitment to professional development: people are encouraged to take responsibility for developing their knowledge and skills and there is widespread commitment to personal learning.

(8) Participative information search: information on the business environment is sought for instance from customers and suppliers and there is on-going recording of relevant information to enhance company planning.

The first six of the above characteristics relate to the elements of learning organisations as identified earlier from the literature. While learning from the past and tacit knowledge are invaluable elements of organisational learning, these need to be built upon by continuing the process. Thus firms aspiring to become learning organisations also need to engage in commitment to professional development and participative information search. Therefore these two characteristics have been added for the purpose of data collection and analysis.

The three case companies reported here were amongst those shadowed over a three-year period and interviews were conducted with management at the outset of the project and after three years. These interviews generated much of the data summarised against the eight characteristics, as set out in Tables I, II and III. Also a self-assessment audit tool was developed in which 27 statements were devised to reflect elements of the eight characteristics of organisational learning. Each company was asked to rate itself on a scale of 1 to 10, in terms of the extent to which these statements were a reflection of what was happening in their company. A score of 1 is where the company had not put any processes in place relating to that characteristic and a score of 10 reflects full adoption within the context of that company. The case companies were then given an average score for each characteristic of organisational learning, as shown later in Figure 1. In the following section, the situation of the three case companies is described and brief accounts given of the ways in which these companies have been trying to adopt an organisational learning perspective.

Examples of innovation and organisational learning in small- to medium-sized companies

1. Brake cable manufacturing company

This UK Midlands based manufacturer was formed in 1947 to manufacture cables for the bicycle industry. Since the mid-1980s the focus of the company's operations has switched to supplying the automotive industry. The company now employs nearly 150 people and has a turnover of Pounds 8 million.

The company currently is a first-tier supplier of brake cables to the automotive industry undertaking both manufacturing and assembly operations, producing approximately 8 million cables per year. Within three years, the company plans to have increased the size of its workforce to 200 employees with a turnover of Pounds 12 million. It is expected that this growth in business will be mainly from the automotive sector and the company is investing heavily in new automation equipment and assembly lines.

Following a management buy-out of the company in 1993, there has been a major change in the way the company is managed. The previous autocratic regime has been replaced with a more open and participative style of management. Evidence of the extent to which the company is trying to develop an organisational learning approach is presented in Table I.

2. Plastics injection moulding company

This example features a medium-sized plastics injection moulding company which is undertaking product and process innovation. It is a medium sized company employing a total of
440 employees (approximately 320 full time equivalents) and a turnover approaching Pounds 20 million. It is both a first-tier and a second-tier supplier, primarily to the automotive industry.

Over the last two years, the cost of thermoplastic raw material, which constitutes approximately 50 per cent of the manufacturing costs has risen by nearly 30 per cent. With such large increases in the price of the raw materials, the company has been prompted to introduce a number of product and process innovations to reduce the amount of raw material waste generated by the injection moulding process and the number of non-value adding activities. Evidence of the extent to which the company is trying to develop an organisational learning approach is presented in Table II.

3. Multiprocess manufacturing company

This company is currently a first-tier supplier to both the Rover and Ford companies and a second-tier supplier to some Japanese automotive companies. The company employs nearly 360 people and over the last six years sales turnover rose from Pounds 9 million to nearly Pounds 21 million, with the greater proportion of this growth occurring over the last three years. This increase in turnover has been predominantly due to increased business with existing customers.

The company manufactures a range of products including seating assemblies, door lock mechanisms and light units. Although the company was originally established in the heart of Birmingham to manufacture wire goods, it has grown to its current size by taking over a number of smaller companies and, in doing so, has inherited a range of manufacturing processes including plastics injection moulding, press working and tube forming. The company has now been able to combine under one roof the range of manufacturing processes acquired over a number of years.

To remain a significant first-tier supplier to the automotive sector the company has had to satisfy its major customers that it can be competitive on the basis of price, quality and delivery. However like many other component suppliers, the company is facing a number of changes including increased overseas competition, rising raw material costs which cannot be passed on to the customers, demands from customers for a cost reduction of 3 per cent per year over the life of three-year contracts and an increasing desire by customers to sub-contract the design of components to their suppliers. Evidence of the extent to which the company is trying to develop an organisational learning approach is presented in Table III.

Discussion and conclusions

Tables I, II and III have outlined the processes within the three case companies which are being adopted in order to try to move towards becoming a learning organisation. The extent to which the companies consider that they have progressed in terms of the eight characteristics of a learning organisation are summarised in Figure 1.

It is easier for smaller firms to maintain face-to-face communications between management and the workforce than in larger firms. In small- to medium-sized companies, like the three case examples, which are quite typical of component suppliers in the automotive industry, processes need to be put in place to facilitate the sharing of mental models of the company’s vision and direction. With the three case companies, two-way communication processes have been introduced, providing opportunities for regular face-to-face briefing sessions. The plastics injection moulding company has given itself a higher rating than the other two companies followed by the multiprocess manufacturing company, which encourages contact between employees and customers as well as having a regular newsletter and briefing sessions. The brake cable manufacturing company has given itself a less generous score, which is probably a recognition of a felt need to put in a more structured communication system with the growth of the firm. Up until now it has been relying upon written communications to update employees and encourage feedback together with informal communication, which are no longer sufficient to ensure that all employees are behind the company’s plans for further growth.
The multiprocess manufacturing company rated itself considerably higher in terms of its support for learning values than the other two companies. This reflects the company's formal commitment to the UK government sponsored "Investors in People" initiative and the extent to which they have encouraged employees to feel free to challenge the opinions of others, even if these opinions come from those more senior in the company. The other two companies are much more self-critical in terms of the limited extent to which they have pursued such openness and the empowerment of employees.

In contrast, in the case of experimentation and innovation, the multiprocess manufacturing company is the most self-critical. Improvements in this company are very much incremental in nature. The company does not operate a suggestion scheme, although they have "kaizen" improvement teams. The plastics injection moulding company also lacks formal procedures to encourage ideas from the workforce but is proactive in bringing in ideas from outside the company. With the brake cable manufacturing company there has been a substantial investment in new projects and they intend that best practice is disseminated through their team structure. Employee suggestions are also actively encouraged in this company.

The plastics injection moulding company claims to have made most progress in terms of encouraging legitimate politics within the company, whereby power and authority is widely dispersed. Here, departments develop their own business plans and have autonomy in addressing their own objectives. In the case of the other two companies, power and authority is not widely dispersed but both companies anticipate that they will move more in this direction over time.

The brake cable manufacturing company is the most self-critical in terms of the extent to which it has been learning from the past, particularly because it has lacked formal procedures for recording information. The other two companies are more satisfied with this aspect of their operation as they have well-organised recording systems in place and the multiprocess manufacturing company has trained all its managers and supervisory personnel in QS9000. However, senior management in this company appeared to give minimum feedback from these QS reports, which suggests that the company has not perhaps progressed as far as it claims.

In terms of a synthesising perspective, the plastics injection moulding company claims the greatest progress. Here the managing director is involved in encouraging employees to seek the views of others in the company and he acts as a mentor to employees at all levels. In the brake cable manufacturing company individuals also openly seek the views of others in the factory and desire to become more involved in the development of the business. In the multiprocess manufacturing company teamworking is the main source of working with others but the teams maintain a hierarchical structure, which limits the involvement of members in final decisions.

Figure 1 indicates that the plastics injection moulding company considers that commitment to professional development is its most highly developed characteristic. This is due to the introduction of national vocational qualifications (NVQs) in different areas of the business. The brake cable manufacturing company has also encouraged the attainment of NVQs amongst its employees and its development programme is designed to prepare them to cope with rapid change in the business. In the multiprocess manufacturing company there is a system of annual individual performance reviews but it is recognised that newer employees are more responsive to this procedure than those who had been with the company prior to its location to its current site.

Participative information search in order to understand more about the business environment is another priority for the plastics injection moulding company where it uses its involvement in a number of external initiatives to gather such information. It is also active in benchmarking programmes. Both the brake cable manufacturing company and the multiprocess manufacturing company take a somewhat different approach as they use customers and suppliers as a major source of market intelligence.

Managers are often aware that their future strategy can be constrained or assisted by the past and making past events and patterns accessible can provide a rich source of learning that
especially useful when formulating a future strategy or plan. Based on this premise, Mills et al. (1998) propose the use of strategy process charting as a means of making the past strategy of companies explicit and they use case examples of automotive suppliers to illustrate the practical application of this technique. Although such an approach can be used to make managers more aware about how their strategy was formed there is still a need for companies to develop the means of using this information to improve their strategic decision making. This is where the use of an audit tool of the type described here can be applied to assist managers in evaluating their progress towards improved organisational learning. The self-ratings by the three companies reported here indicate a generally confident appraisal of their progress in terms of developing the various characteristics of learning organisations.

A closer examination of what the companies are actually doing, however, suggests that so far they have made most progress in terms of the aspects which provide only limited challenge to the power and authority of management. As small- to medium-sized companies they have recognised the need for more formal procedures and improved documentation but apparently have only limited confidence in their employees' ability to understand and become committed to all aspects of their companies' strategies for change. This is perhaps not surprising given the rapid pace of change and restructuring within the industry with which these companies have had to contend in the recent past. It is nevertheless encouraging that although so far they travel somewhat more in hope than in achievement, their positive approach to endeavours to become a learning organisation makes them valuable members of a “best practice” company network.

The structure of the audit tool has enabled the researchers to collect both comparative data on actual practices within companies and management perceptions of their significance in managing the process of change towards becoming learning organisations. It has proved to be meaningful within the context of small- to medium-sized enterprises in a sector that is undergoing major restructuring.

It is important for companies to be encouraged to articulate a long-term strategy in ways that enable them to measure their progress towards the attainment of specified goals. This information can then be disseminated to all employees as an encouragement to take an innovative and participative approach to organisational learning and change.

Note
1. The characteristics used were identified by K. Weaving in a presentation titled "Achieving competitive advantage through learning" at the Conference on The Learning Organisation: Strategy and Practice held at the London Metropole Hotel on 8 December 1994. These characteristics were subsequently developed and operationalised by the authors for the study reported in this paper.

References


[Illustration]

Caption: Table I.; Evidence of adoption of learning organisation characteristics by brake cable manufacturing company; Table II.; Evidence of adoption of learning organisation characteristics by a plastics injection moulding company; Table III.; Evidence of adoption of learning organisation characteristics by multiprocess manufacturing company; Figure 1.; Level of adoption of learning organisation characteristics by the companies