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Power and Inter-Organizational Learning: Intertwining New Knowledge

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Abstract

The ability to learn from customers and suppliers is key to improvements in productivity and longer-term competitive advantage in smaller firms. However, SMEs lack the internal structures, routines and procedures by which larger organizations absorb knowledge. Therefore, we suggest that inter-organizational links are essential if owner-managers are serious about institutionalising new knowledge. To demonstrate how this process operates we re-conceptualise the 4I learning framework to incorporate inter- as well as intra-organizational linkages. The 5I framework suggests that SMEs must maintain a balance between exploration and exploitation if the firm is to remain competitive. We also extend the original model by suggesting the 'feedback' learning processes are shaped by the power of owner-managers. Two case studies provide clear illustrations of the way in which owner-managers can mediate the absorption of new knowledge from external organizations, but also the role that external organizations can play in encouraging organizational learning in small firms.

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Introduction

Inter-organizational networks are an important source of new knowledge and are central to the innovation process (Drucker, 1985; Rothwell, 1992). Systematic incorporation of new knowledge requires development of a firm's absorptive capacity to encourage effective dissemination and exploitation (Zahra and George, 2002; Van Den Bosch, Van Wijk and Volberda, 2003). Moreover, Nesheim (2001) contends that empirical studies support the argument that a firm's strategic core is strengthened through transactions with suppliers (and other business networks) that go beyond traditional market-based interactions. Limited absorptive capacity means that small firms concentrate on knowledge exploitation rather than exploration (March, 1991). Exploitation is concerned with the effective application of current knowledge by focusing on the 'refinement, routinisation, production and elaboration of existing experience' (Holmqvist, 2003:99). Strategic renewal (Vera and Crossan, 2003) requires mature firms to break-out of their path dependencies (David, 1985) through the acquisition and incorporation of new knowledge. Although SMEs provide a significant contribution to employment and GDP (Tilley and Tonge, 2003) individually they generally lack the managerial, entrepreneurial and technical skills required to identify and absorb new knowledge (Yli Renko, 2001; Penrose, 1959). As a consequence, SMEs are less productive and lag larger organizations in the adoption of modern management techniques and new technologies (Acs et al 1999; Mole et al, 2004). This learning failure means that most SMEs are increasingly ill-equipped to operate in a global economy.

Child (1997) argues that top-management's perception of market conditions has a significant influence on the recognition and exploitation of opportunities. In SMEs this is even more important since the influence of the owner-manager or senior management team is pervasive (Stanworth and Curran, 1976). Organizational learning in SMEs cannot be isolated from the needs, goals and expectations of key individuals who are responsible for decision-making (Molander, 1986). Barriers to small firms becoming 'learning organizations' include the small business culture, size-related constraints, political processes as well as owner-manager constraints (Wyer et al, 2000). Limited managerial resources mean that smaller firms are dependent on knowledge from external sources. As a consequence, utilising feedback from customers and suppliers is a key learning source (Gibb, 1997). In their 'systematic literature review', Pittaway et al (2004) confirm that customers are important for suggesting incremental improvements to existing products and identifying new markets (see also Ragatz et al, 1997). Links with suppliers also appear to be more important for helping promote radical innovation (Perez and Sanchez, 2002; Romijn and Albu, 2002).

Understanding the responsiveness of SMEs requires attention to problems associated with transferring individual knowledge to the collective level through appropriate systems (Liaio et al, 2003). Therefore, owner-managers must develop ways of interrelating and connecting knowledge since firms cannot evolve without the acquisition and development of additional resources (Chandler and Hanks, 1998; Tsoukas, 1996). This view is confirmed by writers such as Brusoni and Prencipe (2001:1033) who contend that 'specialization of knowledge production will make firms' external knowledge relations ever more important'. Nahapiet and Ghoshal (1998:243) also point out that knowledge capture requires communication structures that provide access to 'actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit'. However, for a variety of reasons, including the reluctance to delegate power and share knowledge, autocratic and defensive management behaviours persist in SMEs (Jones, 2003). Where this is the case, it is unlikely that SME managers will be wiling, or able, to develop systems of knowledge sharing that can lead to genuine organizational learning. Here then, if customers, suppliers and other interested stakeholders, such as development agencies, are to encourage genuine organizational learning necessary for strategic renewal, an understanding is required of how SME managers can be encouraged or supported in institutionalizing processes that reflect and support organizational learning.

The paper begins with an overview of the organizational learning (OL) literature and this is followed by a brief outline of the 4I learning framework developed by Crossan, Lane and White (1999). Thereafter, we explore and develop criticisms of the original model to consider suggest how it might be developed in order to understand the peculiarities of OL in small firms. In particular, we consider the central role of the SME manager and the relationships of power both within the firms and within inter-organizational networks. Following a discussion of our methodology, we present data on two cases which illustrate the key elements of a revised conceptual framework. We then discuss our findings in the context of both the OL literature and strategic renewal in SMEs and suggest both practice and policy implications.

Understanding Organizational Learning

According to Holmqvist (2003) two approaches dominate the OL literature. One concentrates on ways in which 'formal organizations' (firms, hospitals, universities etc) learn from experience. This focuses attention on learning within organizations and is 'the most common unit of analysis' (Holmqvist, 2003:101). The second approach examines learning through formal collaborations such as strategic alliances or joint ventures. Inter-organizational learning is based on experiential rules that are, in part, distinct from intra-organizational rules and, consequently, collaboration is seen as a 'unique learning entity'. Many influential authors suggest that the processes of inter- and intra-organizational learning are fundamentally different (March and Simon, 1958; Pfeffer and Salancik, 1978; Thompson, 1967). Other researchers acknowledge the importance of learning communities which cross organizational boundaries. In the R&D literature the term 'invisible college' demonstrates the importance scientists place on inter-organizational communications (Price and Beaver, 1966). More recently, theorists of situated learning pay attention to a range of social practices which are not constrained by organizational boundaries (Brown and Duguid, 1991; Lave and Wenger, 1991; Wenger, 1998). Collaboration may encourage organizations 'to increase their store of knowledge' and facilitate learning 'faster than acquisition through experience and more complete than acquisition through imitation' (Huber, 1991:97). This creates opportunities to challenge current practices, since a more democratic style of social organization within collaborations helps subvert existing norms. However, Holmqvist (2003:102) argues that, in general, learning partnerships are seen as 'very loosely coupled' because organizations differ in terms of experience and capabilities. Although he acknowledges that this is not the case in the institutional literature in which organizational fields contain largely homogenous organizations (DiMaggio and Powell, 1983; Scott, 1995). Nevertheless, Yli Renko (2001) found that benefits of knowledge transfer were accelerated where network relations were 'loosely coupled', possibly because deeper relations, while reducing transaction costs, limited access to wider reservoirs of learning opportunity. While March (1999) acknowledges that studies of organizations within a community 'complicates' theories of routine-based learning, we still lack a framework which demonstrates how learning entities relate to each other (Holmqvist, 2003; Grant and Baden-Fuller, 2004).

Links between inter and intra-organizational learning can be analysed by incorporating ideas related to the exploration and exploitation of knowledge (March, 1991). Exploitation is concerned with the effective application of current knowledge by focusing on the 'refinement, routinisation, production and elaboration of existing experience' (Homqvist, 2003:99). As pointed out by Leonard-Barton (1994) core capabilities can rapidly solidify into core rigidities without exposure to new knowledge. Hence, exploration focuses attention on such organizational activities as experimenting, innovating and risk-taking. According to March (1991: 71), 'maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity'. Nevertheless, existing theories suggest that organizations are either engaged in processes of exploration or exploitation (Weick, 1979). A number of authors who have examined learning processes from a longitudinal perspective demonstrate that organizations 'sequentially go through periods of exploitation and exploration' (Engestrom *et al*, 1999; Nonaka, 1994; Weick and Westerly, 1996). Studies of organizational life-cycles also demonstrate an inter-play between evolution and revolution during stages of growth (Greiner, 1972; 1998; Macpherson *et al*, 2004). As Holmqvist (2003:100) points out, '[t]his dynamic view on organizational exploitation and exploration seems, however, not to have gained sufficient attention in the literature'. Holmqvist (2003:107) proposes that intra and inter-organizational learning are *intertwined* through the processes of exploitation and exploration. As a result, the learning process involves 'four interrelated transformations' that occur within and between organizations: acting, opening up, experimenting and focusing.

- Acting occurs when the organization is in an ongoing process of exploitation;
- Opening-up comes about when the organization moves from a process of exploitation to exploration;

- Experimenting takes place when the organization is in an ongoing process of exploration; and
- Focusing occurs when the organization moves from a process of exploration to a process of exploitation.

The *trigger* for opening-up comes from a growing feeling that things have to be done differently perhaps as a result of some internal crisis or because external stimuli destablises the organization's steady state (Jönsson and Lundin, 1977; Tushman and Romanelli, 1985). As Holmqvist (2003) points out, 'opening-up' activities are well documented in the literature through a range of terms including; unlearning (Hedberg, 1981); diversification (Starbuck et al, 1978) and de-learning (Jönsson and Lundin, 1977). In most cases, opening involves the creation of alliances with organizations that have different skills, knowledge and competences. Because opening-up challenges existing routines (March et al, 2000) it is likely to be accompanied by some internal conflict as the organization goes through a period of 'critical self-reflection' (Engestrom et al, 1999).

The 4I Learning Framework

Although the field of OL has grown rapidly in recent years it lacks consistency in terminology which inhibits the creation of cumulative knowledge. One of the most widely quoted attempts to give greater theoretical coherence is the 4I framework (Crossan *et al*, 1999). OL is conceptualised as a process incorporating thought and action shaped by institutional mechanisms, which are the basis of every established organization. According to Crossan *et al* (1999:523) learning at the individual, group and organizational levels is linked by four social and psychological micro-processes. Intuiting and interpreting occur at the individual level; interpreting and integrating occur at the group level; integrating and institutionalising take place at the organizational level. The processes of learning are defined in the following manner (Crossan *et al*, 1999:525):

> *Intuiting is the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience. The process can affect the intuitive individual's behavior, but it only affects others as they attempt to (inter)act with that individual.*
>
> *Interpreting is the explaining of an insight, or idea to one's self or*

others. This process goes from the preverbal to the verbal and requires the development of language.

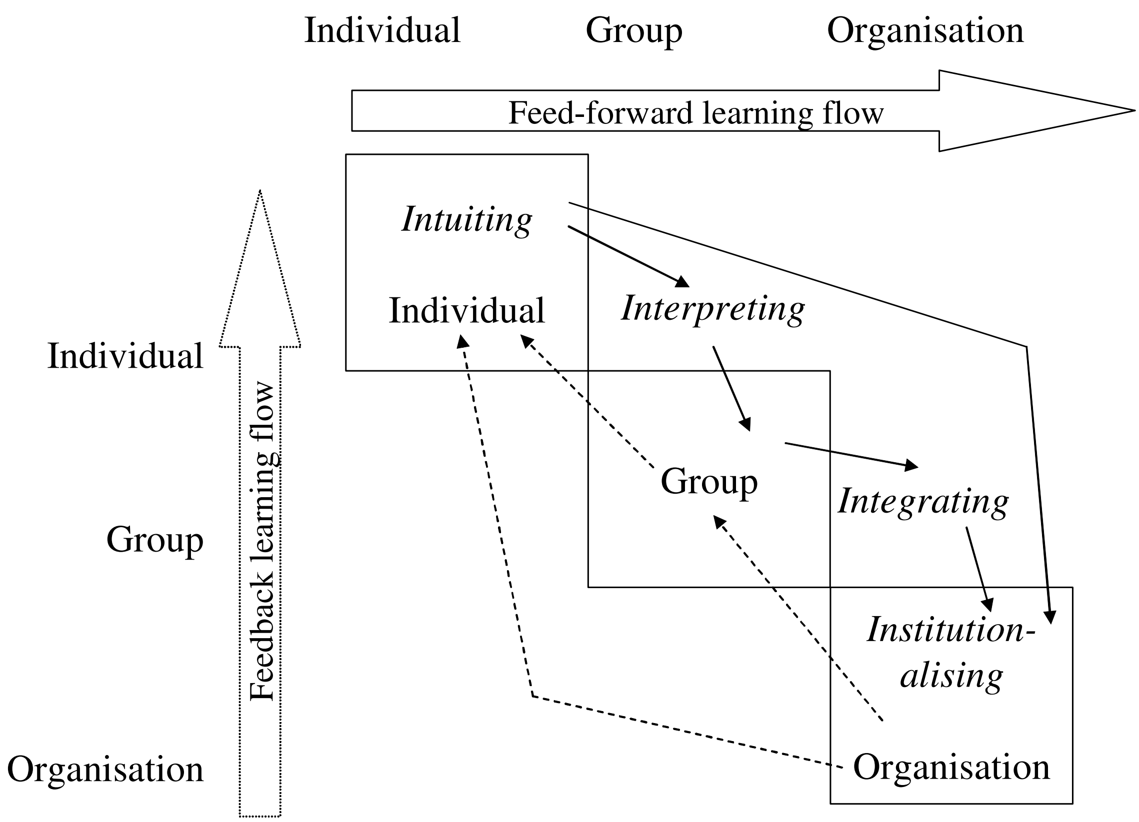
Integrating is the process of developing shared understanding amongst individuals and the taking of coordinated action through mutual adjustment. Dialogue and joint action are crucial to the development of shared understanding. This process will initially be ad hoc and informal but if the action is recurring and significant it will be institutionalised.

Institutionalising is the process of ensuring that routinised actions occur. Tasks are defined, action specified and organizational mechanisms established to ensure that certain actions occur.

Institutionalising is the process of embedding individual and group learning into the organization's systems, structures, procedures and strategy.

The process of OL is illustrated in Figure 1 which also distinguishes between stocks and flows of learning. Learning stocks occur at each of the three levels and are created as a result of inputs and outputs to the learning process. 'Feed-forward' learning takes place through flows from individual to group to organization. The interpretation, integration and institutionalisation of learning prompts feedback flows through the three levels. This process certainly bears a strong similarity to the knowledge creation cycle (Nonaka and Takeuchi, 1995) and the tension between feed-forward and feedback is similar to the tension between exploration and exploitation (March, 1991).

Figure 1. The 4 Is Organizational Learning Model (Crossan et al, 1999)



In response to encouragement from Crossan *et al* (1999) to 'refine' their model Zietsma, et al (2002) add two new concepts to the original framework. First, Zietsma et al (2002) regard intuiting as too passive and suggest that the term 'attending' captures a more active process of information seeking. Secondly, 'experimenting' is described as a parallel activity carried out by individuals and groups which adds substance to the process of interpreting (Zietsma *et al*, 2002:63). Data from a case study of a Canadian logging company provide support for the significance of these two activities during organizational learning.

> *Most organizations have institutionalised scanning mechanisms. However feedforward learning is enabled only when individuals attend to data that is not part of the normal organizational attention pattern.... The experimentation process provides specific feedback on their intuitions and interpretation in controlled risk environments' (Zietsma et al, 2002: 71-2).*

While attending and experimenting capture important dimensions absent in the original framework it appears that Zeitsma *et al* consider organizational learning taking place in a vacuum. This seems to be a particularly significant omission since they examine the way in which stakeholder pressures eventually prompted learning in *MacMillan Bloedel*. They also note the way in which prior learning created a 'legitimacy trap', essentially closing off the attention of senior management to an alternative discourse about acceptable logging practices. Thus, the dimensions of power and politics, both internal and external are ignored in the development of Crossan *et al's* framework.

Conflict can occur as a result of new ideas and new knowledge that create challenges to existing processes and procedures within the organization (Fiol, 1994). It is noteworthy that neither Crossan et al (1999) nor Nonaka and Takeuchi (1995) address this issue of conflict in their respective models. Engeström (2000) is particularly critical of knowledge creation as a cyclical and sympathetic process of conflict-free socializing. The notion of knowledge consensus suggests knowledge as a benign social dimension that is achieved through the dialectical conversion process. Engeström (2000:968) however, argues that expansive learning occurs more from 'conflictual *questioning* of the existing standard practice'. Gherardi and Nicolini (2002) also point to tension between consonance and cacophony in the establishment of meaning. They argue that explanations of learning overemphasize mutuality in understanding and ignore the discontinuity and conflict that co-exist within knowledge systems. For collective understandings to be constructed requires a challenge to the accepted assumptions within a community. It requires a break from the accepted order, creating disorder and conflict before new assumptions are accepted or rejected. As Hopkinson (2003:1965) observes:

> *'discourse may lose meaning, and even cause confusion, when imported to an organization. It may contradict the prior constructions on the basis of which organizational members act.'*

While Brown and Duguid (1991) suggest that day-to-day practice provides access to alternative conceptions of activity, ultimately, organizational learning requires that communities legitimate innovatory activities developed through these relationships (Fox, 2000). Since OL involves a collective acceptance of experiences and rules it will either be facilitated or constrained by social relationships that exist in an organization (Bogenrieder, 2002) as well as by the relationships of power that are embedded in all social interactions (Contu and Willmott, 2003). This is particularly pertinent in SMEs, where, generally, the owner-manager or management team hold significant levels of influence and are reluctant to relinquish power, delegate responsibility or distribute knowledge through formal systems of organizing (Jones, 2003).

Crossan and her colleagues do use an early version of the 4I model to discuss inter-organizational learning and as the authors point out: 'learning involves *institutionalizing*: the processes of incorporating new knowledge and skills into the systems, structures and procedures of the organization' (Tiesessen et al, 1997:384). We differ from this view because such structures and procedures do not exist in the majority of small firms. For new knowledge to become embedded within the 'memory' of such firms requires an external organization to act as a substitute for those internal structures. Learning from other organizations can be formalised in strategic alliances or join ventures (Inkpen and Crossan, 1995; Kale et al, 2000) or may be informal *via* 'invisible colleges' or communities of practice (Price and Beaver, 1966; Brown and Duguid, 1991). The process of 'intertwining' illustrates the mechanisms by which learning takes places at the interstices between organizations and not simply within organizational boundaries. We deliberately use the term intertwining because it suggests an active engagement between the firm and its knowledge network (Holmqvist, 2003). In other words, this re-conceptualisation illustrates that the learning process can benefit both parties.

Our extension to the work of Crossan *et al* (1999) suggests some of the more obvious mechanisms for mutually beneficial learning partnerships (Table 1). For smaller firms, links with customers and suppliers are the most easily accessible source of new learning. These links may be based on customer requests for improvements in products and services or supplier suggestions for cost reductions by streamlining their joint processes (such as EDI). Engagement with the regulatory environment, particularly concerning financial accounts or taxation, may also lead to learning by the adoption of activity-based costing for example. Rather than being based on one-off transactions, in most small firms, such relationships are likely to be part of on-going network relationships in which knowledge sharing benefits both parties (Taylor and Pandza, 2003). However, we also recognize that these relationships are unlikely to be conflict free. Rather, it is probable that inter-organizational networks will include asymmetries of power that may be deliberately used in order to encourage, or impose, the institutionalization of learning (Agrell *et al*, 2004; Rokkan and Haugland, 2002; Watson, 2004).

Table 1 Organizational Learning and Renewal (Crossan *et al*, 1999)

Level	Process	Inputs/outcomes
Individual	Intuiting	Experiences Images Metaphors
Group	Interpreting	Language Cognitive map Conversation/dialogue
Organization	Integrating	Shared understanding Mutual adjustment Interactive systems
	Institutionalising	Routines Diagnostic systems Rule & procedures
Inter-organization	Intertwining	Customer requirements Supplier suggestions After-sales service Regulatory environment

Original Model

Extension to original model

Inter-Organizational Learning

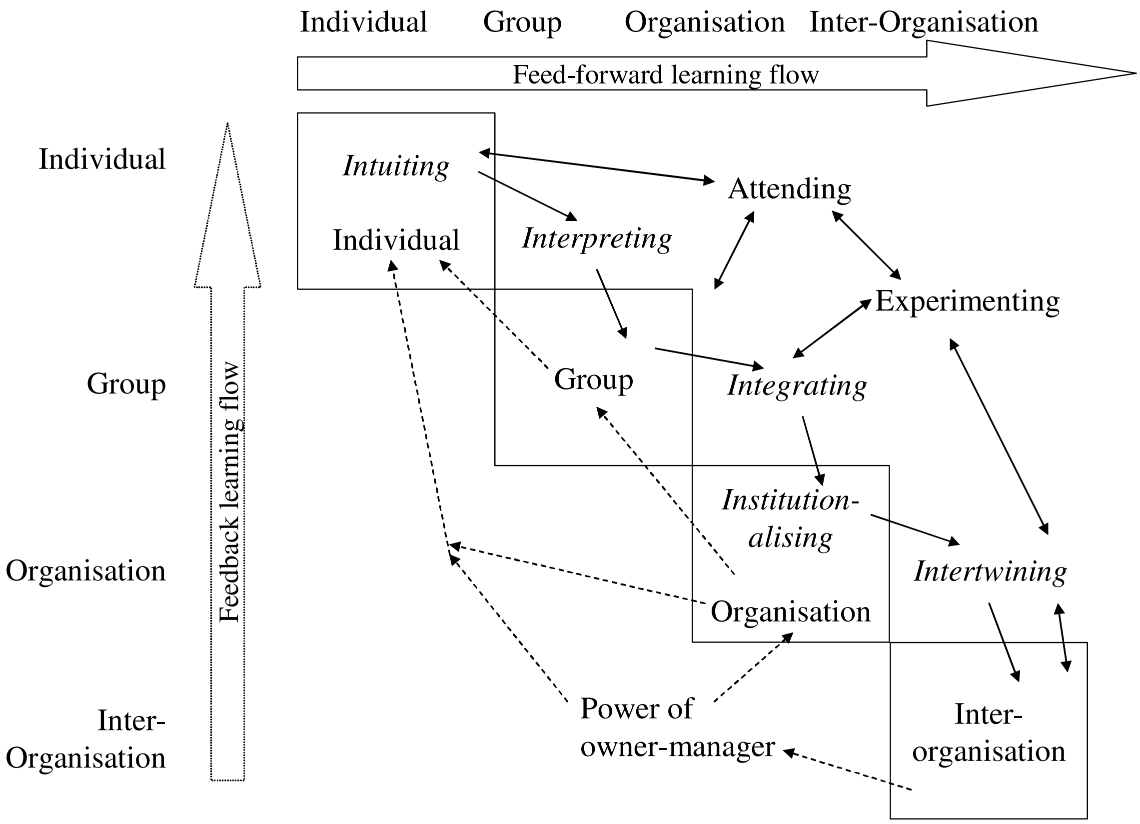
To be effective, learning at the individual and group levels must be transferred to the organizational level (Sundbo, 1998; Nonaka and Takeuchi, 1995). As Crossan *et al* (1999:529) point out 'the process of insitutionalization sets organizational learning apart from individual and *ad hoc* group learning'. In established organizations, learning is embedded in systems, structures and routines as well as in electronic format such as databases (Alavi and Tiwana, 2003). Hence, learning in large organizations can be largely independent of the agency of individual actors if not their actual roles. If a key employee leaves then such structures ensure that knowledge and learning capacity are retained. It is, however, important to acknowledge that there are restrictions on the ability of organizations to absorb new knowledge (Crossan *et al*, 1999: 533). Van Den Bosch *et al* (2003) argue the antecedents of absorptive capacity are based on the firm's internal mechanisms for absorbing knowledge: communication structures and the character and distribution of expertise. This draws attention to the way organizational structures directly influence absorptive capacity (Lane and Lubatkin, 1998). However, as Cohen and Levinthal (1990) originally argued, identifying absorptive capacity means examining structures of communication between 'the organization and its environment' as well as between subunits. Thus, Zahra and George (2002:185) re-conceptualise absorptive capacity as a set of organizational routines through which knowledge is acquired, assimilated, transformed and exploited.

We propose that there are substantial differences between absorptive capacity in large, well-established organizations and such activities in SMEs. It is acknowledged by Crossan *et al* (1999:529) that 'new' organizations lack established structures and routines which means learning is concentrated on individuals and groups. However, this situation does not only exist in new organizations but it is almost certainly the case in the majority of micro (up to 9 employees) and small firms operating in the 10-49 employee size-band. As is well-established in the small firm literature such organizations are dominated by the entrepreneur (owner-manger) who rely on direct authority and high levels of informality (Rothwell, 1989; Vossen, 1998). Furthermore, such firms are less able to attract high-quality employees and are less likely to engage in training than larger firms (Jones, 2003). Hence, the organizational ability to absorb new knowledge is less evident in small, owner-managed firms. Therefore, we suggest that intertwining is particularly important for institutionalising learning in firms that lack the sophisticated structures of large organizations. For example, routines, diagnostic systems, rules and procedures are less evident in SMEs as owner-managers rely on flexibility and informal communication mechanisms. While such factors are key sources of competitive advantage in smaller firms it means that institutionalising learning is more difficult.

We suggest that links with other organizations including customers, suppliers and knowledge providers help institutionalise learning in SMEs by providing structures that are otherwise absent (Gibb, 1997; Pittaway et al, 2004). The processes of opening-up and experimenting are particularly important in demonstrating the importance of knowledge-sharing links between organizations (Homqvist, 2003). Our extension of the 4I framework incorporates inter-organizational relationships *via* Holmqvist's concept of intertwining (Figure 2). The model demonstrates that both feed-forward and feedback learning flows are linked to other organizations. For example, the development of integrated supply chains means that small firms are increasingly encouraged to share learning (feed-forward) with customers and suppliers (Macpherson and Wilson, 2003). Although feed-forward is important for building competitive advantage we also focus on how external organizations promote the institutionalization of new knowledge in SMEs. Furthermore, intertwining with suppliers, customers or knowledge providers promotes feedback learning flows within the recipient company. The institutionalization of external knowledge leads to a cycle of integrating, interpreting and intuiting as employees learn from operating new procedures. In addition to intertwining activities we also suggest that feedback processes are intrinsically linked to the owner-manager's power. For example, the degree to which the owner-manager is willing to share their knowledge with other managers and employees will directly influence the extent to which genuine organizational learning takes place (Child, 1997; Stanworth and Curran, 1976; Jones, 2003). Fully institutionalizing new knowledge promotes further learning as the associated activities are incorporated into existing practices promoting integrating, interpreting and ultimately intuiting.

It is also important to note that the degree of interaction, trust and inequalities of power embedded in relationships influence the nature and extent of organizational learning (Coopey and Burgoyne, 2000; Contu and Willmott, 2003). Institutional structures and organizational social architecture limit legitimate interactions since they define the norms, conventions and expectations of social relationships (Gertler, 2003). Politics and power are not something that can be ignored when analyzing organizational learning since they are always present (Coopey, 1995). In SMEs, this will be particularly important given the proprietary nature of owner-managers' internal power but also because of their relative lack of power within the wider network (Figure 5). Indeed, as Child and Heavens (2003:321) argue 'possibilities for conceiving and acting upon new insights are likely to be defined by those structures that are already in being and enjoy legitimacy'. There is potentially tension between the relative power of owner-managers to define work practices within their organization and the power of organizations within the network to encourage the institutionalization of learning in order to change and formalize work practices in smaller firms.

Figure 2. The 5I Organizational Learning Model



The Distinctive SME Learning Process

Our objective in this paper is to reconceptualise the 4I model by incorporating managerial power and external links into the internal learning processes. In doing so, we adopt a similar approach to Crossan *et al* (1999) who use Apple Computers to illustrate their model. Therefore, to express the processes of intertwining we draw on two cases undertaken as part of other research projects. The cases demonstrate the utility of our model rather than offer confirmatory empirical support. We suggest that this approach is appropriate because of the importance attached to a better understanding of how learning and organizational renewal can be promoted in smaller firms.

The first case examines activities associated with the introduction of new manufacturing methods into *MFD* a privately-owned manufacturing with approximately 200 employees. Data were acquired from a variety of sources including observation, regular discussions with the owner-manager, company documents and fifteen semi-structured interviews with all managers and supervisors who were directly involved in the changes. The BRW research was carried out over a two-year period. Data incorporated five interviews including two audits of managerial systems and three interviews lasting between 90 minutes and two hours with the owner-manager. Interviews were taped and transcribed; information on the audits was collated and analysed to provide to provide a comprehensive overview of management systems within the organization. In addition, company documentation was made available for scrutiny to support the research. We do not claim that these companies are in any way representative of small firms in general. In fact, one of the clear distinctions between SMEs and large firms is their heterogeneity compared with the 'isomorphism' of large organizations. For example, companies operating in particular sectors whether they are universities, banks or pharmaceutical companies share many common characteristics.

Another key distinction between large and small firms is the significance of the owner-manager. It is acknowledged that the entrepreneur is the major determinant on the way in which small businesses 'behave' (Bridge *et al,* 2003:187). That is, the characteristics of small business ventures generally closely reflect the founder's motivations (Chell *et al*, 1991; Glancey, 1998). This is confirmed by Sadler-Smith *et al* (2003:53) who found a statistical significant link between organizational growth and entrepreneurial style (Covin and Slevin, 1988). Therefore, our argument is that smaller firms are diverse because they are established in ways that reflects the approach of entrepreneur. Consequently, small, owner-managed firms are different because they reflect differences between individual entrepreneurs. Secondly, and this is central to our reconcepualisation of the 4I framework, small firms are not subject to the same institutional pressure which typify large organizations. To take the example of HR (human resource) practices which in large firms are similar because of regulatory requirements and the influence of bodies such as CIPD (Chartered Institute of Personnel Directors). Small firms have, until recently, been excluded from much employment legislation and such firms are typified by their 'informal' approaches to HR (Taylor, Shaw and Atkinson, 2003). Two contributory factors are the lack of personnel specialists in most small firms (Duberley and Walley, 1995) and the unwillingness of managers to engage in consultation with employees (Atkinson and Curtis, 2001). Taylor *et al* (2003) conclude that although the 1999 Employee Relations Act encouraged more formality in employee relations smaller firms are still typified by high levels of informality. The authors go on to suggest that the reluctance of owner-managers to acknowledge 'employee rights' reflects their unwillingness to accept external influences on their independence and autonomy.

To summarise, the dominant role of the owner-manager and the lack of institutional pressures mean that smaller firms are much more diverse than their larger counterparts. Furthermore, because owner-managers are unwilling to delegate meaningful responsibility to employees SMEs lack the structures, procedures and organizational routines which typify large firms. This has two major implications for learning in SMEs. First, the majority of external contacts are based on the owner-manager and all new knowledge tends to be channelled through one individual. Secondly, there are no formal mechanisms by which knowledge can be shared and retained at an organizational level. Hence, our argument that external links are central to the promotion of effective learning within SMEs, since suppliers and customers provide the a means by which knowledge can be institutionalised.

Case 1 – BRW

BRW is a privately-owned precision machine engineering company with 70 employees which utilises CNC machines to produce components for larger manufacturers. Towards the end of the 1990s, MD Roger Wilson intuited a shift in the relationship between customer and suppliers. Lucas Aerospace, BRW's main customer at the time, set up a strategic sourcing initiative that removed decisions from local buyers. In order to win business, suppliers had to meet stringent performance criteria, and evidence-based performance improvements were required in all contracts. Although Wilson felt he was making savings and improving product quality, he could not provide evidence to his customer.

> *They were looking for good business strategy you know. What are you doing to cut costs? How much scrap do you produce? I knew we'd made cost savings, but I couldn't produce evidence. My knowledge of what was going on in the company was all word of mouth. I knew*

we'd scrapped a job yesterday but by tomorrow that was all forgotten…. I knew I wasn't performing well in these audits.

It was clear to Wilson that if he was going to maintain his major customer in the long-term he would need to provide competitive year-on-year improvements. It was also clear that his company's internal management systems were not adequate and lacked the professionalism that had become the norm within the industry. However, he did not have the expertise or knowledge in order to turn things around.

It was very frightening because I didn't really know what to do. I knew I wasn't giving my customer what he wanted. I knew these strategic sourcing people weren't going to pick BRW and I also knew we were in danger of losing the work.

He was fortunate that Lucas Aerospace, concerned by the number of failed supply audits, set-up a supplier development programme, which was delivered by a Further Education College in collaboration with Lucas Aerospace. Initially skeptical, he started to 'open up' and attended to information provided by the college and his customer and considered what might be useful within the company.

Well there's this college and they're telling me that all big companies use these tools and techniques and I thought, they can't all be wrong, you know. It was a realization that these must work for them to be so popular and I started to cherry pick and listen to what could work in BRW.

This allowed the MD to gain experience in quality and continuous improvement techniques used in large firms. Continuous improvement was the key factor in winning work from Lucas, and Wilson was able make explicit what he was already doing and to improve his own systems by experimenting with systems discussed on the course. Initial improvement in internal systems was the result of a process that involved interpretation, experimentation and integration.

I started doing graphs, putting them on the wall and showing the workforce exactly what was going on… I started realizing, hang on a minute, we're producing a bit too much scrap here, there's too much waste involved. I'm throwing money down the drain…. You started tackling the problem. Plus I think the fact that we started to record things meant that every issue was being tackled, and your employees were involved more in discussions… it was discussions that solved the problem together.

Although the discussions allowed shared problem solving, at this stage the processes were still informal. To support the change, he also created a quality function and appointed a quality manager in order to help institutionalize the new systems.

However, the move to continuous improvement techniques was a radical departure from previous informal work practices. Staff were initially suspicious of his intentions. The MD and workforce were not experienced in formal production reviews and employees were initially reluctant let go of adopt new work practices.

At this stage, and in order to reinforce the need for change, the MD again enlisted the help of Lucas Aerospace. He took his workforce to an away-day presentation delivered by Lucas in order to set the change programme in a wider business context. He also got the workforce involved in practical activities by engaging a consultant to train them in continuous improvement techniques. In addition, the MD recruited a production manager with large firm and continuous improvement experience to provide a formal focus for production improvement. Production systems were formalized with the set-up procedures and manufacturing methods for every job stored on computer. This information was used to optimize workflow and enable seamless handovers between shifts. Information from these formal manufacturing and quality systems was captured and used as a management aid to review and control quality, cost and production problems. The successful institutionalization of quality and continuous improvement enabled BRW to demonstrate professional manufacturing management techniques to current and prospective customers, retain existing business, and win new business by demonstrating cost-conscious, high-quality manufacturing procedures. With the support of his customer, consultant and the college, Wilson was able to overcome resistance and institutionalize new attitudes and behaviours. They had effectively helped him to institutionalize both the systems and the behaviours expected within large commercial manufacturing.

Case 2 - MFD

MFD is a medium-sized (200 employees) privately-owned manufacturing company founded over 50 years ago to supply casting and machined components to the Ministry of Defence (MoD). The period of study coincided with the company making the transition from the batch production of engineering components to the mass production of electronic products. This move from batch to mass-product required an intensive period of organizational learning. Unfortunately, neither MD Mark Fletcher nor any of his managers had experience of mass production. Initially, conventional batch production methods continued to be utilised and there were a range of factors contributing to shop-floor inefficiency including an ancient MRP (material requirement planning) system, which made it difficult to track material flows through the factory. Mass production exacerbated this problem and operator ‘waiting time’ increased as a result of material shortages. The work of white-collar staff was also inefficient as store-keepers and material controllers spent a considerable amount of time searching for missing components. Intuiting occurred when Fletcher discussed his problems with representatives of *LaComm*, MFD’s main customer, who had experience of mass production. A number of suggestions were made including use of flow-lines for assembly work and the incorporation of quality procedures into the job descriptions of operators (rather than being the responsibility of quality control). However, rather than simply implement these new approaches, Fletcher then engaged supervisors, stores personnel and the quality manager in discussions about the appropriateness of these activities within MFD. In other words, the intuiting phase which involved *LaComm* was followed by internal process of interpreting and integrating prior to implementation.. These changes to shopfloor layout and the associated investment in new equipment would not have occurred without pressure from the company’s main customer.

> *‘Mr Fletcher has spent a lot of money during the last 2 or 3 years. If he hadn’t we’d be out of business because LaComm would go elsewhere even if it was only to second-source suppliers. We’re tooled up for the electronics trade and we need to stay in it. We’re buying dollops of equipment - a third of a million pounds a time’ (Production Manager).*

Institutionalising the changes proved more difficult as shop-floor employees constantly reverted to their conventional forms of work organization. Fletcher again utilised his links with *LaComm* to help overcome shop-floor resistance and institutionalise the changes. *LaComm* representatives provided direct assistance by explaining to supervisors and operators the importance of professionalizing their manufacturing activities. Fletcher also used *LaComm* as a ‘lever’ to minimise resistance amongst first-line supervisors and operators to changes in traditional working practices and encouraged the company to become more market focused.

> *‘We’ve always manufactured to customer requirements but that is a reactionary position. Now we’re proactive and draw customers in. That is a dramatic difference and the awakening of that reality was brought about by LaComm and required commitment from the chairman down’ (Material Controller).*

Fletcher also decided to take advantage of a Regional Development Agency (RDA) programme to improve manufacturing practices in small firms. The RDA project, which emphasised the importance of Kanban and shopfloor teams, in combination with the new layout, helped *MFD* shift towards the principles of lean manufacturing. The project involved a consultant from the RDA helping managers and supervisors understand how ideas associated with modern manufacturing practices could resolve their own production problems. The RDA consultant then helped Fletcher and his management team actually introduce and embed these new working practices with shopfloor workers. Although the RDA's assistance was important everyone in the company knew they were reliant on *LaComm's* orders to sustain improvements in performance. Hence, the argument "*LaComm* say we must do this" was usually enough to overcome resistance to new working practices amongst managers, supervisors and shopfloor workers.

Discussion: Intertwining Knowledge in SMEs

'Opening-up' (Holmqvist, 2003) indicates that an organization shifts from the exploitation of existing knowledge to the exploration for new knowledge. Small firms, particularly those in stable sectors, generally emphasise knowledge exploitation rather than exploration (March, 1991). Exploitation is concerned with the effective application of current knowledge by focusing on the 'refinement, routinisation, production and elaboration of existing experience' (Holmqvist, 2003:99). Strategic renewal (Vera and Crossan, 2004) requires firms to break existing path dependencies as they shift from exploitation to exploration which focuses attention on the recognition and assimilation of new knowledge. Moving from exploitation to exploration is likely to prove difficult in most small firms and, as discussed below, may occur as a result of some internal crisis. While this issue is clearly important the main focus of this paper remains the mechanisms by which new knowledge is actually institutionalized within the firm. The stage when the organization moves from exploration to exploitation is described as 'focusing' by Holmqvist (2003). In other words, knowledge acquired externally must be firmly embedded within organizational procedures and routines if it is to be effectively exploited.

What we illustrate *via* the cases of BRW and MFD is that external organizations have a key role to play in helping smaller firms absorb and institutionalize new knowledge. Within both firms the owner-managers recognized the need to access knowledge from external sources to renew the strategic position of their respective companies. Both underestimated the difficulties associated with their absorptive capacity because of the lack of formal structures and procedures. *LaComm* and *Lucas Aerospace* provided Fletcher and Wilson with up-to-date knowledge about contemporary manufacturing practices. More importantly, both companies played an active role in ensuring new ways of working, particularly a commitment to quality and continuous improvement procedures, became institutionalized within MFD and BRW. The fact that both firms were well-established and had rudimentary managerial structures illustrates the scale of the problem for newer or less developed companies.

Our objective in this paper is to extend the 4I framework (Crossan et al, 1999, Zeitsam et al, 2002) by incorporating the role of owner-manager power and external links to organizational learning. That inter-organizational learning, both formal and informal, takes place is widely established in a range of literatures (Cohen and Levinthal, 1990; Inkpen and Crossan, 1995; Kale *et al*, 2000; Lane and Lubatkin, 1998). In fact, Holmqvist (2003) sets out what he describes as a 'dynamic model' in which intra- and inter-organizational learning are *intertwined* rather than being discrete activities. Our approach differs in three ways; first we focus specifically on the unique problems of learning in SMEs. Secondly, we highlight the role played by external organizations in actually institutionalizing learning within the focus company. Again, we suggest that this is a distinct feature of SMEs which, without the influence of external partners, lack the systems, procedures and routines by which to embed knowledge. Such firms are typified by high levels of informality which provides a key source of advantage in competing against larger, better resourced but more bureaucratic organizations. The negative impact is that SMEs do not possess the structural mechanisms for knowledge-sharing which are taken for granted in large organizations. Thirdly, we focus on the asymmetries of power associate with owning and managing small firms: on the one-hand, proprietary rights provide owner-managers with unchallenged authority within the firm. On the other hand, owner-managers have little real influence in their external relationships with more powerful customers and suppliers (Agrell *et al*, 2004; Rokkan and Haugland, 2002; Watson, 2004).

Even when owner-managers overcome hurdles associated with the identification and acquisition of knowledge there are still formidable barriers within the firm. The assimilation, transformation and exploitation of that knowledge demands the creation of structures, systems and routines to broaden the scope of learning from an individual level (the owner-manager) to the organizational level (Liao et al, 2003). Hence, the importance of external actors (customers, suppliers and regulators) who help embed learning at the organizational level. Our revised model (Figure 2) indicates that external organizations have a role to play in the 'feed-forward' processes by which knowledge created as a result of individual 'intuiting' is interpreted, integrated, institutionalized and intertwined. In our two cases, we primarily focus on the feedback processes by which new knowledge becomes institutionalized as a result of pressure from customers or suppliers. This, we suggest, is the key to strategic renewal in SMEs as external knowledge must be effectively institutionalized if 'learning' is to shift from the level of the individual owner-manager to the organization as a whole. Although, as Green point out (2004), institutional approaches to the diffusion of managerial practices emphasise the importance of those practices to the pursuit of rational goals (higher productivity or quality). In contrast, the 'rhetorical turn' allows diffusion to be decoupled from institutionalisation so that, for example, those with power can force new practices on others (Green, 2004: 665).

It is instructive here to analyse the significant asymmetries of power involved with OL activities taking place within these case organizations. First, it is unlikely that learning would have been achieved had the owner-managers of the two firms not 'intuited' and 'opened up' to the problems caused by a lack of institutional systems necessary to manage production effectively. Their roles were central to the move from exploitation to exploration. However, this 'opening up' was stimulated by recognition that major customers were dissatisfied and had the *power* to withdraw their orders. Moreover, the actual institutionalization drew on the credibility of the customer and other outside agencies to help to resolve conflict within the organizations and thus allow learning to be fed-back and embedded in systems of production. Knowledge was distributed throughout the organizations and systems ensuring that learning will be retained even if current staff members leave.

That OL achieved in these firms was dependent on the dynamics of specific contexts exemplifies the gradual shift within the literature from cognitive approaches to 'situated learning theory' (Lave and Wenger, 1991). Situated learning approaches pay more attention to the broader organizational context including culture, 'mediating' artefacts and power relations. Lave and Wenger (1991:35) draw attention to the fact that learning is situated within everyday work activities and is 'an integral part of generative social practices in the lived-in world'. Contu and Willmott (2003) identify links between power, particularly in terms of control over resources, and the possibility of situated learning taking place. We suggest that this issue is particularly significant in SMEs where 'proprietary rights' give owner-managers much greater direct power than conventional managers who must rely on 'bureaucratic authority'. As pointed out by Hardy and Clegg (1995) both Marx and Weber acknowledge that power is derived from the ownership and control of the means of production. Although, in his more sophisticated analysis Weber rejected the view that power was reducible to categories of ownership or non-ownership.

> *'Organizations could be differentiated in terms of people's ability to control the methods of production, as influenced by technical relations of production, and embedded in diverse occupational identities from which grew the subjective life-world of the organization' (Hardy and Clegg, 1995:623).*

Hence, all organization members have some opportunity to exercise creativity, discretion and even to challenge 'structures of domination'. As Hardy and Clegg (1995:624) go on to say 'power in organizations necessarily concerns the hierarchical structure of offices and their relationship to each other'. A short, but highly influential, monograph by Steven Lukes is the most widely-quoted source of our understanding of power. Lukes (1974) identifies three dimensions of power and this conceptual framework was very important in studies of the UK's system of industrial relations during the 1970s and early 1980s. The framework has been updated by Hardy and Leiba-O'Sullivan (1998) with the addition of a fourth dimension which takes account of poststructuralist perspectives on power (Table 2). The four dimensions of power can be defined as follows: the first dimension is pluralist, the second is coercive, the third is ideological and the fourth disciplinary. If we assume that A represents the owner-manager and B represents the employees then this framework provides the potential for categorising power relations in a range of SMEs. At the same time, it is a consistent theme of this paper that a defining feature of SMEs is that proprietary rights mean the exercise of power, and its influence over access to knowledge, is more overt than in larger organizations. It is also likely that the type of power exercised by owner-managers directly influences the nature of knowledge generated within new firms. However, in the process of intertwining, it is also the power held within other organizations that can be used to overcome, or suppress, dissenting voices that inevitably arise during the learning process as old systems of work organization are challenged. As Engeström (2000) argues, learning is not a conflict-free process of socialization. Rather it is an iterative and contested process where historical experiences and current contexts create tensions (Tsoukas, 1996). Resolving tensions requires the ability both to define and legitimate new routines and activities. In the cases presented here, institutionalization of learning depends on the influence of the customer to define acceptable production standards and processes. It also required the owner-manager to accept this definition and to employ the customer in legitimating change, eventually institutionalizing learning through the adoption of new routines.

Table 2 Dimensions of Power (Hardy and Lieba-O'Sullivan, 1998)

	1st Dimension	2nd Dimension	3rd Dimension	4th Dimension
Power of A over B	Management of resource dependencies	Management of decision-making processes	Management of meaning	None - embedded in the system
Interaction of A and B	Overt conflict	Overt and covert conflict	Apparent cooperation	Local struggles
Reasons for B's failure to influence outcomes	B aware of issues but unable to use power effectively to influence outcomes	B aware of issues but unable to get to decision arena	B unaware of issues and has no will to resist	A and B prisoners of prevailing discourses of power although A derives greater advantage
Empowerment of B	Acquisition of resources and ability to mobilise	Access to decision arena	Consciousness raising and 'delegitimation' strategies to create will to resist	Empowerment not possible although local struggles may produce a more positive experience
Key authors	Thompson, 1956 Pettigrew, 1971 Pfeffer and Salancik, 1974 Pfeffer, 1981 Hickson et al, 1971	Crenson, 1971 Hunter, 1980	Clegg, 1975 Pettigrew, 1979 Ranson et al, 1980 Martin, 1982	Foucault Cooper and Burrell Hassard, Knights, Willmott *ad nauseum*

Conclusion: Practice and Policy Implications

In this paper we extend the original 4I framework by identifying the significance of external organizations and owner-manager power to learning in SMEs. As a means of demonstrating the utility of our model we introduce two case studies of learning in small, independent firms. To summarise, both firms renewed their activities by tapping into knowledge and expertise from their main customers. This activity was clearly part of the feed-forward process (Crossan et al, 1999) as inter-organizational links helped resolve intractable problems in both DFM and BRW. Further, in both firms, pressure from their main customers helped institutionalize new knowledge by encouraging the adoption of more professional managerial practices. Because knowledge was embedded within organizational processes and systems (rather than in the head of owner-managers) learning was fed-back to groups and individuals *via* the micro-processes of integration, interpretation and intuiting.

Morgan and Morrison (1999) suggest that 'models' are important in both natural and social sciences because they mediate theory and empirical phenomena. To learn from conceptual models 'it is important to justify more clearly what theoretical and empirical aspects are selected and how they are addressed in the proposed model' (Van Den Bosch *et al*, 2003:295). In this paper we have sought to extend the 4I model by incorporating ideas related to inter-organizational learning. We have also drawn on literature associated with SMEs to demonstrate that organizational learning in small firms is very different from larger firms. In particular, effective organizational learning requires owner-managers to relinquish some proprietary control to enable other actors to have more involvement in the acquisition, dissemination and application of that knowledge. We have used two cases as a way of illustrating the utility of our model and accept that the data do not provide empirical support in a manner that would be appropriate in the natural sciences. This mirrors the approach adopted by Crossan *et al* (1999) in their original conceptualization of the 4I framework. The original conceptual model has subsequently been validated and extended by other authors including Crossan and Berdrow (2003) and Zietsma *et al* (2002). Organizational learning in SMEs has been largely ignored in favour of greater focus on 'entrepreneurial learning' by the academic community. We suggest that our conceptualization provides the opportunity for a more rigorous focus on the mechanisms by which small firms acquire new knowledge as a basis for organizational renewal. Not least of all because the need to compete in an increasingly globalised economy means that service firms as well as manufacturing firms can only remain competitive in the longer-term by becoming knowledge-based organizations.

While our main aim has been to improve the conceptual understanding of how SMEs renew their activities it is also suggested that this paper has implications for the practitioner community. What we know from the limited research on organizational learning in SMEs is that owner-managers are both the main means of accessing new knowledge and at the same time the barrier to dissemination of that knowledge within the firm (Cheouke and Armstrong, 1998). This paradox is related to the way in which owner-managers exercise their proprietary rights which means that they are reluctant to cede power to others within their company. Consequently, in SMEs the owner-manager is usually responsible for the majority of external contacts (suppliers, customers, regulators, finance providers) and retain tight control over internal decision-making. Therefore, we conclude that to promote strategic renewal owner-managers must first of all ‘open-up’ their companies to external knowledge sources. Secondly, owner-managers must allow customers and/or suppliers to help create the internal mechanisms by which real organizational learning can take place. Institutionalizing learning means establishing the systems, procedures and routines by which external knowledge can be disseminated to all employees within the firm.

We further suggest that the policy community can make use of the ideas expressed in our model to improve managerial practices within small firms. For example, measures such as the number of employees or turnover are acknowledged to be unsatisfactory ways of categorizing small firms (Tilley and Tonge, 2003). Entrepreneurial firms tend to be ‘learning organizations’ as owner-managers match internal resources to external opportunities (Bridge *et al,* 2003:187). However, ‘lifestyle’ businesses founded by entrepreneurs who simply want a reasonable income will be very different than fast-growing firms established by ‘innovatory’ entrepreneurs (Chell *et al*, 1991). That is, the characteristics of new business ventures will generally closely reflect the founder’s motivations (Glancey, 1998). This is confirmed by Sadler-Smith *et al* (2003:53) who found a statistical significant link between high growth and entrepreneurial style (Covin and Slevin, 1988). In other words, it is possible to hypothesise that entrepreneurs who emphasise organizational learning will place more emphasis on innovation and growth. Thus, an alternative approach might adopt measures related to a firm’s ability to absorb new knowledge. This could incorporate an understanding of how the elements or systems of absorptive capacity identified by Zahra and George (2002), acquisition, assimilation, transformation and exploitation, are addressed within the firm. It would be relatively straight-forward to ‘measure’ a firm’s ability related to knowledge exploration (high, medium, low) and exploitation (high, medium, low). Even such a simple categorization would provide the policy community with a more effective template for intervention.

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