BUILDING AND SUSTAINING LEARNING NETWORKS

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ABSTRACT

Research suggests that there are a number of potential advantages to learning in some form of network which include being able to benefit from other's experience, being able to reduce the risks in experimentation, being able to engage in challenging reflection and in making use of peer group support. Examples of such configurations can be found in regional clusters, in sector groupings, in heterogeneous groups sharing a common topic of interest, in user groups concerned with learning around a particular technology or application and in supply chain learning. Although there is clear potential in such shared learning and some evidence of its being achieved in a few cases it is clear that learning in such configurations does not take place automatically. This paper addresses some of the management challenges involved in setting up and nurturing learning networks. It draws particularly on case examples of learning networks in operation in the automotive components and timber products industries in South Africa..

Keywords: learning networks; innovation; South Africa

INTRODUCTION

It is a truism to state that firms need to innovate in order to survive in an increasingly hostile and turbulent environment. Without regular assessment and change in what they offer (product innovation) and/or the ways in which they create and deliver that offering (process innovation) there is a considerable risk of their losing competitive edge and eventually failing. In the context of developing countries this achieves a particular significance (Kaplinsky 1993) where the challenge is to build sustainable competitive advantage through developing a manufacturing sector which is competitive on world terms – measured on price and non-price dimensions such as quality, flexibility and speed of response (Best 2001). In addition firms will need to place growing emphasis on developing the ability to create and modify products rather than producing to an externally determined set of specifications.

The challenge is not simply one of identifying what ahs to change but also how to *implement* strategic prescriptions and this represents a key issue in innovation. (Voss 1986; Leonard-Barton 1988). In particular it focuses attention on the problem of learning and the ways in which enterprises organise and manage the process of

acquiring and absorbing new knowledge and transforming it into competitive capabilities. This paper explores this theme and reports on one approach to supporting its development through formal network arrangements.

LEARNING IN ORGANIZATIONS

In principle firms have a number of opportunities available to them to enable learning – through experiment (e.g. R&D), through transfer of ideas from outside, through working with different players (suppliers, partners, customers), through reflecting and reviewing previous projects and even from failure. There is some agreement that learning can be viewed as a cyclical process, involving a combination of experience, reflection, concept formation and experimentation (Kolb and Fry 1975). Learning only takes place when the cycle is completed - thus effort in some but not all quadrants may not necessarily lead to learning. Learning is not automatic - there must be motivation to enter the cycle, and if there is insufficient arousal, learning may not take place.

Studies of organizational learning suggest that it can be supported by structures, procedures, etc. to facilitate the operation of the learning cycle - for example, through challenging reflection, facilitated sharing of experiences or planned experimentation. (Garvin 1993). But it is also important to recognise different types of learning, from simple adaptive improvements to what already exists through to strategic challenges – 'turnover learning' – in which new approaches have to be absorbed and deployed (Senge 1990). For this reason learning to learn - learning to design and operate learning systems – is an important attribute of the development of learning organisations (Argyris and Schon 1970)

AIDS TO LEARNING

Two challenges – of meeting an innovation imperative which requires learning and dealing with the difficulties which most firms face when trying to learn – have led to considerable research and experimentation around mechanisms to support and facilitate the development of learning capabilities. In public policy terms, for example, this has led to considerable growth in the provision of advice and counseling/consulting services as an instrument of innovation policy. (Bessant and Rush 1995) One approach with considerable potential is to mobilize shared learning amongst and between firms (Bessant and Tsekouras 2001).

Experience and research suggests that shared learning can help deal with some of the barriers to learning highlighted earlier. For example,

- in shared learning there is the potential for challenge and structured critical reflection from different perspectives
- different perspectives can bring in new concepts (or old concepts which are new to the learner)
- shared experimentation can reduce perceived and actual costs risks in trying new things
- shared experiences can provide support and open new lines of inquiry or exploration

- shared learning helps explicate the systems principles, seeing the patterns - separating 'the wood from the trees'
- shared learning provides an environment for surfacing assumptions and exploring mental models outside of the normal experience of individual organisations - helps prevent 'not invented here' and other effects
- shared learning can reduce costs (for example, in drawing on consultancy services and learning about external markets) which can be particularly useful for SMEs and for developing country firms.

A key element in shared learning is the active participation of others in the process of challenge and support; this powerful enabling resource underpins a widely used approach for development of individual learning capabilities.(McGill and Warner Weil 1989) 'Action learning', as the concept became known, stresses the value of experiential learning and the benefits which can come from gaining different forms of support from others in moving around the learning cycle. Part of the vision of Revans, one of the pioneers of the concept, involved the idea of 'comrades in adversity', working together to tackle complex and open-ended problems (Revans 1980; Pedler, Boydell et al. 1991)

Its potential as an aid to firms trying to cope with a challenging and continuing learning agenda has led to a number of attempts to establish formal arrangements for inter-organisational learning. For example, the experience of regional clusters of small firms, which have managed to share knowledge about product and process technology and to extend the capabilities of the sector as a whole, is recognised as central to their abilities to achieve export competitiveness. ((Piore and Sabel 1982); Best 1990). In work on supply chain development there is a growing recognition that the next step after moving from confrontational to co-operative relationships within supply chains is to engage in a process of shared development and learning. (Hines 1994; Kaplinsky, Bessant et al. 1999; Bessant, Kaplinsky et al. 2003)

LEARNING NETWORKS

Learning is often involved as a 'by-product' of network activities – for example, emerging through exchange of views or through shared attempts at problem-solving. But it is also possible to see learning as the primary purpose around which a network is built; this concept of a 'learning network' can be expressed as:'*a network formally set up for the primary purpose of increasing knowledge'*. Such networks share a number of characteristics:

- they are formally established and defined
- they have a primary learning target – some specific learning/knowledge which the network is going to enable
- they have a structure for operation, with boundaries defining participation
- processes which can be mapped on to the learning cycle
- measurement of learning outcomes which feeds back to operation of the network and which eventually decides whether or not to continue with the formal arrangement

Examples include ‘best practice’ clubs (whose members have formed together to try and understand and share experiences about new production concepts), ‘co-laboratories’ (shared pre-competitive R&D projects), supplier associations and sectoral research organisations (where the aim is to upgrade knowledge across a system of firms). Learning may also involve ‘horizontal’ collaboration (between like firms) or ‘vertical’ cooperation (as in supply-chain learning programmes), or a combination of the two. Bessant and Tsekouras offer a typology of such arrangements (Bessant and Tsekouras 2001).

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LEARNING NETWORKS IN PRACTICE

Amongst examples of such arrangements in operation is the case of Toyota where an active supplier association has been responsible for sustained learning and development over an extended period of time (Dyer and Nobeoka 2000). Hines reports on other examples of supplier associations which have contributed to sustainable growth and development in a number of sectors particularly engineering and automotive. (Hines, Cousins et al. 1999) Marsh and Shaw describe collaborative learning experiences in the wine industry, whilst another study reports on experiences in the agricultural and food sector in Australia.(AFFA 1998; Marsh and Shaw 2000). Case studies in the Dutch and UK food industries, the construction sector and aerospace provide further examples of different modes of learning networks organised around supply chains. (Fearne and Hughes 1999; AFFA 2000; Dent 2001) In an earlier paper we reported data from six UK supply chain learning networks studied in depth (Bessant, Kaplinsky et al. 2001) which indicated improvements both for the main customer and its suppliers, confirming that supply chain learning programmes can, in principle, be ‘win-win’ programmes.

There are particular problems for learning networks in developing countries. These economies share a number of common characteristics which inhibit learning processes; their markets tend to be supply-constrained and favour low-income goods, so that the incentives to technical change are often weak and are overly-biased towards process changes. Moreover, they often tend to be low-trust environments, and are generally characterised by low levels of skill and poorly articulated national and regional systems of innovation. In many cases they are often also associated with low levels of competition and dominated by firms with low degrees of specialisation (since in the import-substituting industrialisation era, large conglomerate firms tended to have a wide spread of activities). In the following section we look briefly at two cases involving the use of learning networks in the South African automotive components and furniture industry as an example of what can be achieved in developing country environments, despite the adverse circumstances which these sometimes involve.

THE SALIGNA VALUE CHAIN

(for a more detailed description of this example, see (Morris 2001))

The Saligna value chain group was stimulated by external crisis and internal need for change in order to survive. Externally, by a massive reduction in domestic market demand of Saligna (eucalyptus timber) from its traditional market as cheap tough mine stopes, as well as the rise of global environmentalism opening up higher value added export opportunities for Forestry Stewardship Certified (FSC) hard wood

furniture. The internal stimulus came from the plantation companies and sawmills who dominated the value chain looking to new markets. Furniture vied with pulp, paper and chips as an alternative. Simultaneously the furniture manufacturers were experiencing raw material shortages. These were not however sufficient to overcome the historical lack of trust and cooperation. It was a combination of neutral, *external intermediaries* and sector *change agents* championing co-operation, that overcame the impasse.

The cluster brought together representatives from all the major sectors in the value chain –growers, sawmills, furniture manufacturers, the furniture export council, and two key government departments – who, in mapping their value chain, brought out the key problems between each link. Technical task teams comprising the enterprise participants were set up to tackle the two key issues identified of maximising a) the quantity and quality of the timber supply, and b) upgrading of the product's design, marketing and branding for the export market. In fact the quantity and quality of supply dominated the entire life of the cluster, and the manufacturing upgrading issues were left on the back burner.

The technical task teams focussing on supply achieved some notable successes: improved knowledge flows, standardised measurement, greater wood recovery rates, utilisation of younger trees for certain products, suitable densities for different manufacturing applications, better grading. The cooperative ventures of the group had limited success with respect to upgrading challenges. It did generate efficiency and upgrading *information,* improved *supply chain efficiency* from sawmills to manufacturer, developed potentially *new product* opportunities but which were never realised, and contributed to upgrading *technical abilities* within firms. However the key challenges of process, product and functional upgrading were left largely untouched. Instead of trying to foster horizontal cooperation to tackle these issues and create collective efficiencies in performance, the manufacturers used the supply issue to avoid opening up the black box of firm inefficiency, treating it as purely a logistics value chain problem and not as a price and efficiency utilisation issue. Consequently they lobbied for cheap wood, railing against timber being sold at higher prices to the pulp and paper industry, and focused on final products with little high quality design, hardly any value adding branding, and insufficient emphasis on finishing. Despite initial success the cluster collapsed when the firms were asked to pay membership fees, the external intermediaries resourcing the cluster withdrew, and the two key internal change agents amongst the manufacturers were bought out.

THE AUTO COMPONENT BENCHMARKING CLUBS

(for more detailed description of these cases see (Barnes and Morris 1999))
The shift from import substituting industrialisation (ISI) to trade liberalisation, a major drop in tariff protection and rapid integration into the world economy in the 1990s, meant that the South African auto component sector faced significant challenges. Either they became internationally competitive quickly or the assemblers would source most components internationally and domestic producers would fail. The potential crisis facing them was highlighted by a university research project aimed to assist industrial restructuring of selected sectors in the province of KwaZulu-Natal. The research results, comparing local firms with international competitors, were disseminated widely through numerous workshops and firm visits, and the

quantitative data shocked a number of firms in the industry. It catalysed some of the firms' CEO's to push the academics involved to play a completely different role – as *neutral external intermediaries* to form and operate a continuous improvement cluster. With partial government financial support and firm membership fees (on a 65:35 ratio) the KwaZulu-Natal Benchmarking Club was formally launched in January 1998.

The KZN Benchmarking Club was founded with 12 member firms – 11 component companies and one large assembler. The executive consisted of 2 member firm representatives plus two external facilitators from the service provider (i.e. the external intermediaries). The Club was based on providing the following services to its members: an annual benchmark comparing each firm against a 'like for like' international competitor; a lengthy (strictly confidential) diagnostic report measuring the operational performance[1] levels of each firm member including a survey of their five major customers and suppliers; a monthly newsletter outlining aggregated benchmark findings; quarterly workshops discussing generic findings, common problems and various solutions to competitiveness problems; encouragement of information sharing through visits etc.

However lack of trust, fear of sharing information, and old ISI mindsets looking to blame anyone else (e.g. government, assemblers, suppliers etc) for their problems, government inefficiencies and bureaucratic stupidity, meant that it took some time to really take hold as a proper functioning cooperating cluster generating collective efficiencies. The key moment occurred when the firm members took ownership of the cluster – for example, when the quarterly workshops were shifted from a neutral (university) venue to one of the firm premises, and the firm representatives (as opposed to the external intermediaries) gave lead presentations focussing on their own experience in sorting out various problems. From then on the previous reluctance to share information very rapidly faded, and the lack of trust dissipated. The success of the KZN Club led, within a couple of years, to two other sister Clubs being formed in the other heartlands of the automotive component industry – first in the Eastern Cape (Oct 1991) and later in Gauteng (mid 2001). These Clubs operate along the same operational and governing principles as the original KZN Club. What had started off as a small single regional cluster, by March 2003 had grown to three linked clusters covering the entire country and comprising 52 automotive firms (with another 5 currently in the process of negotiating membership). Linked not only by a common service provider and a common information newsletter with minor changes for club specific 'news', but also because member firms often attended each others quarterly workshops thus spreading knowledge sharing between the Clubs.

The success of these clusters can best be measured along four criteria: increasing *knowledge sharing*, significant *learning* and spontaneous *firm visits* by members; major improvement in their *operational performance* as reflected in a variety of competitiveness indicators; and finally, the spread of the Clubs as *new members* were

[1] This was gauged through a market driver approach measuring the following critical success factor indicators: cost control (work in progress, raw material stock, finished good stock, total inventory), quality (customer return rates, internal reject rates), external flexibility (lead times, delivery frequency), capacity to change (output per employee, absenteeism, job turnover, training expenditure) R&D expenditure on new product development

attracted. The clusters are primarily based on firms wanting to ensure continuous improvement and operational performance enhancement in order to make them more internationally competitive through their membership. The best quantitative indicator of the impact of these three clusters on the member firms is the impact they have had on the competitiveness of the cluster members as measured by improvements in the operational performance of Club member firms. Although a wealth of information is available and is shared with firms on a regular basis, only the overall summary (table 1) of progress in process upgrading of Club member firms both in relation to their own improvements and relative to an international sample of benchmarked firms is presented below.

Table 1: Learning, operational performance change, and comparative advantage of Club members[2]

CSF	KPI	South African Firms						Comparator Firms	
		N	1998	1999	2000	2001	*Improvement 1998/99-01*	W. Europe N=14	Emerging economy N=12
Cost control	Total inventory (Days)	32	62.6	54.3	47.6	42.0	*32.8%*	31.2	38.6
	Raw material (Days)	32	32.3	27.9	25.2	21.8	*32.7%*	17.2	19.2
	Work in progress (Days)	32	12.4	8.9	8.1	8.2	*34.3%*	5.3	8.6
	Finished Goods (Days)	32	17.8	17.5	14.3	12.1	*32.0%*	8.6	9.5
Quality	Customer return rate (PPM)	23	3270	2638	1406	1240	*62.0%*	549	624
	Internal reject rate (%)	25		4.9	4.2	3.9	*20.7%*	1.9	3.5
	Supplier return rate (PPM)	21		21989	14637	18518	*16.0%*	8319	13213
Flexibility	Lead time (Days)	17		19.9	19.1	17.9	*9.9%*	16.8	12.0
	Supplier on time & in full delivery (%)	23		78.7	82.1	82.2	*4.5%*	92.2	92.3
	On time & in full delivery to customers (%)	25		92.2	92.8	92.7	*0.6%*	96.1	93.5
Capacity to change	Training spend as % total remuneration	30		1.3	1.7	2.0	*56.2%*	1.3	3.1
	Absenteeism (%)	27	4.4	4.3	4.1	4.0	*9.4%*	4.2	5.7
Innovation capacity	R&D expenditure (%)	24	1.64	1.70	1.67	2.12	*29.5%*	1.83	2.90

Source: KwaZulu-Natal/Eastern Cape and Gauteng Benchmarking Club database

It is clear that the Benchmarking Clubs as continuous improvement clusters have had a major impact on the internal operational performance of the firms who are members. With the exception of delivery reliability to customers, progress for all of the measures in South Africa has been significant. Despite improvement, the South African components sector has in most respects some way to go before it reaches the global frontier, but given the relatively strong performance of the emerging country competitors relative to those in Western Europe, there is every prospect of the South

[2] This table shows both the learning path and the distance between South African component firms and their international competitors. Time series performance data only exists for 32 South African based component firms (3-4 year period) and there is uneven data amongst this sample hence the varying sample size. Performance in 2001 is matched by a sample of 26 international firms, for which we unfortunately do not have time-series data. The comparative sample is split up so as to chart the performance of South African component firms in relation both to old- and new competitors.

African firms making up a good deal of this competitiveness gap. Generally speaking, South African component firms performance increase is better where internal factors (work-in-progress control, training, absenteeism) are involved than where they are dependent on external factors (raw material inventories, supplier performance). From a value chain perspective this suggests that the growth of learning is still predominantly in the first-tier components suppliers and has not yet diffused widely up the value chain. The relatively poor performance in terms of inventory control is accounted for by logistic problems along the value chain, especially with regard to incoming materials (minimum-sized import quantities; problems at the ports) and distance to the export market (for stocks of finished goods). In general there are clear indications that significant process upgrading has occurred and a substantial movement towards international competitiveness amongst these firms is under way. Clearly a number of factors apart from the Club's operations have played their part in this, but certainly from all accounts the horizontal cooperation, trust building, knowledge sharing and inter firm learning embedded in the operations of these three clusters have played a major and critical role in the process.

The area where improvement has been sub-optimal has been between firms and their external environment – i.e. in areas where the Benchmarking Clubs have had little direct control and influence – throwing up the limits of horizontal cluster cooperation between manufacturing enterprises. It is therefore not surprising that pressure built up to tackle problems along the value chain and as the broader environment as the next arena of operation.

CONCLUSIONS

Analysis of this and other cases suggests the emergence of some common questions round which we can build a 'template' for design and operation of learning networks. In particular it appears that learning networks require attention be paid to managing eight core processes – these are set out in table 2.

Table 2: Core processes in inter-organisational networking

Process	**Underlying questions**
Network creation	How the membership of the network is defined and maintained
Decision-making	How (where, when, who, etc.) decisions get taken
Conflict resolution	How (and if) conflicts are resolved
Information processing	How information flows and is managed
Knowledge capture	How knowledge is articulated and captured to be available for the whole network
Motivation/ commitment	How members are motivated to join/ remain in the network – e.g. through active facilitation, shared concerns for development, etc.
Risk/benefit sharing	How the risks and benefits are shared
Integration	How relationships are built and maintained between individual representatives in the network

Our argument is that networks will be more or less effective in the ways in which they handle these processes. For example, a network with no clear routes for resolving conflicts is likely to be less effective than one which has a clear and accepted set of norms – a 'network culture' – which can handle the inevitable conflicts which emerge. To some extent the strengths and weaknesses of the examples discussed can be interpreted in terms of these – for example, their difficulties in dealing with trust issues or the importance of knowledge sharing and capture about chain-level elements (Morris 2001).

Building and operating networks can be facilitated by a variety of enabling inputs – for example, the use of advanced information and communications technologies may have a marked impact on the effectiveness with which information processing takes place. Independent facilitation appears to have a strong influence on many of the behavioural dimensions (Holti and Whittle 1998).

A key point emerges when the learning challenge becomes more strategic. Moving beyond learning at the level of transferring and absorbing already established and codified knowledge (for example in the case of transferring good manufacturing practices) to more open-ended and exploratory activity poses problems, not least because of the higher risks involved. Arguably the SVC challenge was one of creating new product opportunities and required a higher level of learning than that associated with many learning networks set up to enable the transfer of 'good practice' techniques.

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