ABSTRACT

The DELOS project considered the notion of cluster as a valid categorical construct for mapping SME and the notion of organisational learning as a meaningful operational dynamic for assessing and explaining the "behaviour" of SME.

The key assumptions of this rationale are as follows:

- ⇐ that SME collectively represent the dynamic engine of economic growth, and their aggregate actions are inherently transferable into aggregate economic benefits
- ⇐ that SME reflect structured patterns of interaction
- ⇐ that facilitating clusters of SME will allow diffusion of know-how and innovation to be more efficient
- ⇐ that facilitating aggregate learning amongst SME will stimulate 'intentional' activity and decision-making and allow SME clusters to consolidate their market position or diversify into other markets
- ⇐ that the behaviour of large organisations can act as a role model towards understanding and shaping the collective actions of clusters of SME
- ⇐ that cluster models are transferable across socio-cultural and socio-economic boundaries (including both geographical and sector boundaries).

Starting from these premises, DELOS intended to:

i) verify the modalities through which the SME clusters intervene as learning organisation and investigate the organisational learning processes that arise through clustering ;

ii) give "working" indications capable of supporting training and occupational policies in favour of SME

The main findings of the project – which can be analysed at a doublefold level : methodological and empirical - are the followings:

- the construction of a methodology and the identification of the related tools for analysing the cluster of SMEs and the learning processes taking place within a cluster
- the identification and description of five cluster configuration – as an interpreting model of the SME cluster pattern of interactions
- the assumption of the key role of 'Learning Organisation' and 'Organisational Learning' as a suitable unit of analysis for SMEs that assume the form of cluster
- the in-depth analysis of the existing relations and links between learning processes and structural /institutional features at a cluster level by mean of the case study approach
- the strategic function - both in cluster bottom –up and top – down led – of continuous competence and skills development within SMEs

- the necessity to set up policies and tailored interventions aimed at support the role of local institutions and authorities and local business associations as 'learning agents' and chain of transmission between SMEs and local/national government
- the outstanding role of the education system – among all the technical schools – as a place of knowledge and competence constant renewal

THE DRAWING UP OF A POLICY – ORIENTED GUIDELINES AND PRACTICAL TOOLS TO PROMOTE ORGANISATIONAL LEARNING IN SMES AND SME CLUSTERS. 1. EXECUTIVE SUMMARY

The objectives of the DELOS are:

A) verifying the modalities through which the SMEs clusters acts as learning organisations:

a) how SMEs establish their training, new professional profiles and organisational needs

b) how know-how and competence are transmitted within the cluster

c) how the SME needs become an "input" for the professional training system

d) what is the cost/benefit ratio in the learning process

B) identifying operative models of competence development and transfer within and between SMEs :

a) define a needs analysis methodology applicable to inter-organisational settings

b) supply a methodology for the identification of "nevralgic centres" in the cluster

c) prepare systems of information, organisational and training support, to encourage the development and transfer of competence

d) define tools for self-analysis of critical skills for the maintenance and evolution of the cluster

C) giving "working" suggestions capable of supporting training and occupational policies in favour of SMEs, to be addressed to:

i) European Commission

ii) Member countries

a) activate working connections between the education and training centres

b) instruments for motivating inter-organisational co - operation for the definition of training practices

c) analysis of trends for supply and demand of professions in the labour market

d) determination of the range of services supporting maintenance and/or improvement of performance in the SMEs clusters (in terms of employment and skill adjustment)

As far as the project team is concerned, the 6 partners involved (Italy, United Kingdom, Austria, France, Spain and The Netherlands) represent different approaches and methodologies, one of the tasks of the project being to share a common theoretical and pragmatic perspective of the key - concepts of Delos : SME clusters and learning organisation.

The team involved in the project was as follows:

Project co-ordinator: Istituto G. Tagliacarne (IT)

Partners:

- *Formit (IT)*
- *The Tavistock Institute (UK)*
- *ECWS (NL)*
- *Informacion y Desarrollo (E)*
- *Joanneum Research - InTeReg (AT)*
- *CCI Paris (F)*

As underlined above, the aim of the project is to investigate SME clusters as learning organisations. The project started with a mapping exercise in order to identify the clusters to be further investigated in - depth. Secondly a baseline survey was set up in order to provide common profile of firms (over 300 firms were interviewed) and, thirdly, 12 real clusters were analysed and 12 case studies were written.

The project ends with a reference model identification and suggestions which provides a bridge between the case study work and the Delos final report aimed at identifying:

- a conceptual framework within organisational learning in SME and SME clusters can be depicted and understood;
- a set of practical tools and guidelines to assist policy and practice–oriented actions to support training and employment within the SME sector.

The main results of the DELOS project should be structured as follows:

q **At theoretical level**:

i) ***Taking into account the cluster 'phenomenon' not exclusively as the result of an economic – productive aggregation, but above all as complex of information flows and a pool of knowledge (tacit and explicit) and competencies driven by the interactions and relationships between a number of actors (local institutions, business associations, schools, universities, research centres etc.) which often play the role of 'learning agents';***

ii) ***Applying the learning organisation /organisational learning paradigm to this peculiar subject of investigation.***

It was assumed that learning processes are based on a complex phenomenon which can be articulated in 4 main processes:

1) **Learning by doing and experience -LDE**: that is the way firms accumulate a relevant know-how over time, learn by doing and innovate their routine (technological, managerial, organisational...) and the other actors of the cluster support the firms to develop this learning process.

Key concept: **routine**.

Routines are what is more typical of an organisation, what makes it different from any other, and what allows for its evolution by following the existing path (on one hand, routines are formal artifacts - rules, procedures, conventions - on the other hand, they are something deeply related to cognitive and cultural phenomena - beliefs, frameworks, paradigms). Routines embody both the codified knowledge and the implicit knowledge and they store the memory of an organisation. In the learning organisation, there is an intensive selection among the routines in maintaining and recombining those which work

Focus on:

a) the learning ability of the firms to transfer their experience into new and formally established routines;

b) the ability of the cluster to foster learning from the common application of know-how.

2) **Knowledge sharing - KS**: that is the ways firms consciously organise their internal knowledge flow (communications systems, interfunctional working groups etc...) and the other actors of the cluster actively support the firms in order to develop their communication flows (reciprocal

information, networks, institutionalisation of informal links, etc...).

Key concept : **knowledge as a social construction**

Knowledge in the organisation is largely of a collective nature. The knowledge is built through cognitive interaction between the actors of a given organisation; the ways in which people co-operate, apply and modify the routines, understand the day-to-day reality, record the most important events in the organisational history.

Focus on:

a) main characteristics of the firms as can been seen from the development of their socio - cultural reality. Positive learning dynamics at this level can be improved through open communication and organisation system allowing "double loop learning" style behaviour and interaction;
b) the capacity of the cluster to develop mutual learning among its members

3) **Acquiring relevant external knowledge - AREK**: that is the way firms scan their environments and acquire knowledge relevant for their own development (from clients and suppliers, by imitating, by co-operating, etc..) and the other actors of the cluster actively support the firms for the acquisition of relevant knowledge from different sources (patents, marketing, R&D, organisational consulting, etc...)

Key concept: **reduce the boundaries with the external environments**

At this level the difference between formal and implied knowledge is relevant: at the first level knowledge is an economic asset which firms can buy on the specific knowledge markets (patents, licences etc.); the firm can also create knowledge through its R&D departments or through inter-firm co-operation.

Focus on:

a) the learning capacity of the firm related to the conscious exploitation of every available source of knowledge;
b) the capacity of the cluster to acquire new knowledge which is useful for its members

4) **Developing knowledge and competencies - DKC**: that is the way firms are able to systematically identify, reward and train the competencies they need and the other actors actively support the firms for a rational development of competencies at a local level (common training programmes, placement, etc..)

Key concept: **from an adaptive kind of learning to a generative one**

The ways in which firms and cluster are able to produce, increase and manage knowledge through the continuous use of the learning processes

Focus on:

a) the learning capacity of the firms related to the use of knowledge embedded in people;

b) the capacity of the cluster to promote the competencies acquisition and development.

iii) Identifying an organisational learning model at the SME level. Looking in more details at all the factors shaping organisational learning in SMEs , the DELOS field work considered the relationship between the learning components (the constituents elements with which SMEs construct learning behaviours) and learning processes (the activities through which these elements are constituted in terms of organisational learning).

On this basis DELOS identified three main levels of organisational learning:

- ***information gathering*** – The lower data monitoring, acquisition and management intended to ensure that firm remains aware of changes and developments in the markets in which they operate.
- ***knowledge acquisition*** – A process whereby firms define, acquire the skills, know - how and strategic intelligence necessary to carry out day to day activities.
- ***competence consolidation and development –*** A process whereby existing information and knowledge is converted into learning (through , for example, identifying skills deficits, acquiring new knowledge through training and collaboration)

All three levels encapsulate varying combinations of formal and informal learning activities.

Finally, within the framework of the DELOS project – as a result of the elaboration of the data gathered during the baseline survey (involving over 300 SMEs in 5 countries participating in the project: I, F, UK, AT, ES), - a typology of organisational learning within SMEs was shaped, according to :

- the inter-relationship between information gathering, knowledge acquisition and competence development behaviours
- the relationship between the SME and its institutional milieu, and other structural characteristics (such as size, length of time established and decision - making 'style'.

The first type, which might be described as **'crisis-driven'** exhibits little evidence of organisational learning behaviour. Information-gathering practices, knowledge acquisition strategies and competence development appear to be either absent or rudimentary, and the firm typically responds to challenges and opportunities rather than pursues an active policy of human resource development and strategic management. This category shows a high representation of very small enterprises and new start-ups, whose decision-making strategies are typically shaped by a dominant personality - usually the entrepreneur. The evidence suggest that this type of firm constitutes the largest category of SMEs (around one third of the DELOS sample studied).

Type	*Info gathering*	*Knowledge acquisition*	*Competence development*	*Structural features*
Crisis - driven	unsystematic	reactive	not prioritised	-micro-enterprises -new - firm -entrepeneurial disengaged form the industrial milieu

The second type of firm identified might be described as **'endogenous'**, because learning within the firm is focused on knowledge acquisition processes and behaviours, rather than information gathering or competence development, and these are derived from in-house practices rather than bought in from external sources, or supported by community networks. In this context, knowledge is acquired and utilised primarily through mentoring, on the job experience and 'head hunting' of appropriate qualified personnel.

Type	*Info gathering*	*Knowledge acquisition*	*Competence development*	*Structural features*
Endogenous	unsystematic	-mentoring -on the job experince -buying in new workers	not prioritised	- larger firms disengaged form the industrial milieu

In contrast, the third type of firm - the **'exogenous'** type- though operating outside the margins of its industrial milieu, is outward rather than inward looking and draws on external sources of expertise for developing its skills base. In this case, strategic management practices focus on systematic competence development on a continuing training basis and using specialised training providers.

Type	*Info gathering*	*Knowledge acquisition*	*Competence development*	*Structural features*
Exogenous	unsystematic	-externalised /mainly training courses	high level of formal learning /continuous training	opportunistic use of local networks

The last two types of firm are highly **embedded** within the local industrial milieu, adn use community-based networking for intelligence gathering, acquisition of new knowledge and consolidation and enhancement of skills. The distinguishing feature of the embedded (a) is the limited development of organisational learning . Strategic practices are largely confined to information – gathering , whereas higher level of organisational learning (in competence consolidation and development) is rooted in the utilisation of the community networks, family relationships and informal networking with other businesses. In contrast the learning behaviour in the embedded (b) is primarily focused on competence development using formalised practices and processes, for example technical education and specialised external training.

Type	*Info gathering*	*Knowledge acquisition*	*Competence development*	*Structural features*
Embedded (a) Information centred	Strategic: - exhibitions - links with R&D centres	- unsystematic	- high level of informal learning: family mentorship - links with local firms	-closer links with local networks: highly embedded in industrial mileu

Type	*Info gathering*	*Knowledge acquisition*	*Competence development*	*Structural features*
Embedded (b) Competence centred	Informal : - Chambers of Commerce - other firms	-unsystematic	more formalised competence development	- highly embedded - recently established

iv) Modelling pattern of Smes and Sme cluster behaviour.

Starting from the 12 cluster analysed[1], five possible configuration have been defined :

1) **Porterian** - This type of cluster is situated in a clearly defined industrial melieu, which has well-grounded historical roots and a highly developed cultural identity. The territorial cohesiveness of the cluster reinforces and is reinforced by sectoral homogeneity that provides for collaborative networking between SMEs working in similar markets and production relations. Governance structures tend to be flexible and spontaneous.
2) **Segmented Porterian** - This type of cluster shows similar characteristics to the first type, in that it occupies a well-defined socio-cultural setting with a strong sense of local identity. However, interactions between SMEs within the cluster are also shaped by differentiation in producer-suppler relations and in different market positions and niches within the market. Networking is therefore characterised by loose associations grouped around a central actor; professional associations or a common service base. Governance structures and communication systems are more formalised than in the first type and will typically take the form either of: participatory management structures supported by local agencies; autonomous management through professional associations, or partnership structures administered by local authorities.
3) **Interlocking** - This type of cluster is spatially bounded, but its territoriality is not derived from a particularly anchored socio-cultural identity. Rather, constituent firms working within the cluster have forged links as a result of common interests related to their particular positions within a complex local economy. As a result, this type of cluster is sectorally differentiated rather than mono-sectoral, and its networking arrangements consequently are diverse, ranging from loose

[1] IT1: Brianza (furniture) - IT2: Biella (textile) - IT3: Mirandola (medical devices) - IT4: Prato (textile) - UK1: Asian Family (newsagent) - UK2: TECs Midland (multi- sectoral) - AT: Materials and metals (materials and metals) - ES1: Machine Tool (automobile) - ES2: Automotive components (automobile) - FR1: Jura (toys) FR2: Reflex'Oise (multi - sectoral) - NL: Plato (multi - sectoral)

interest groups formed primarily for promotional purposes through to professional associations within a common project.

4) **Induced partnership** - The main characteristic of this type of cluster is the key role played by external (i.e. non community-based) agencies in formulating a common identity, and in co-ordinating organisational learning within the cluster. Public service actors such as Development Agencies, typically provide communications and decision-making structures that may also be reinforced and supported through central services (for example research and development links with business associations).

5) **Virtual cluster** - The virtual cluster is primarily characterised by the absence (or low importance) of territoriality as a bonding agent or boundary spanner in the development and sustainability of collaborative networking. In the case intensively studied through DELOS, this type of cluster was represented by a national network of family enterprises bound together by a common history and common objectives, with a dominant role played by key entrepreneurial decision-makers, and focused on a particular spatial 'nerve centre' - the historical origin of the network. Other examples, however, include virtual networks or associations with a common activity base, linked together through information and communication technology infrastructure.

q **At methodological level**:

i) ***Elaborating methodologies and related tools for the field work (base line survey and case study reporting), in order to facilitate information gathering and interpretation (e.g. a template, that is the common index to be used for the case study reporting - a standardised 'case study summary' pro forma, which summarises and links: i. the common research questions; ii. the items to be explored. The case studies allow for the exploration and testing of conceptual constructs as well as the analysis of data derived from observing, documenting and decoding the behaviours of actors).***

q **At operational level**:

i) ***Adopting a 'multi-dimension ' approach for the SMEs cluster analysis. The 'toolkit' set up (which represents the summa of the methods and tools elaborated and tested during the field work) intended to encourage reflexive evaluation of the local conditions in cluster with a high proportion of SMEs. The mapping tools are therefore intended to help decision - makers involved in the provision of training and support services to design and plan appropriate policies, policy instruments and actions to assist SMEs. To this extent, the so called 'Cluster Appraisal Toolkit' finally elaborated, incorporates a check list aimed at enabling an appraisal of the cluster to be carried out.***

The checklist is intended to:

a) Establish whether the locale being appraised constitutes a 'cluster' of SMEs

b) Establish broadly what type of cluster it is, in terms of its: territorial, sectoral, morphological and organisational characteristics

c) Identify the strengths and weaknesses of the cluster

d) Relate these strengths and weaknesses to designing 'learning arrangements' intended to maximise the competitiveness of the cluster

e) Identify the 'learning content' to be delivered through appropriate learning arrangements.

The whole process of appraisal comprises of 3 steps.

Step 1: **Establishing the cluster 'if' and 'what type'**.

The object of this exercise is to establish how far a particular 'locale' constitutes a cluster, i.e. exhibits both structural and behavioural characteristics that do or could facilitate collaborative and collective learning. To make this appraisal, an 'environmental audit' of the locale is necessary. This audit is comprised of three exercises, using three frameworks,

1. Territorial mapping.

This identifies two main dimensions (and related attributes) for the cluster:

- its economic and market characteristics
- its socio-cultural base (community emebededness and identity).

Using a framework which matches economic and cultural homogeneity with the five cluster typology :

- make a description of the cluster attributes for each dimension listed;
- make a judgement of whether each attribute is a strength or a weakness. A 'rating scale' can be used to apply a quantitative measure of how strong or weak.

2. Morphological mapping

This identifies the organisational and institutional characteristics of the cluster, its market characteristics and the nature and strength of collaborative networks, in terms of:

- size and recency of constituent firms
- characteristics of the market (stable or dynamic)
- type and degree of inter-firm collaboration
- type and nature of institutional management of cluster (influence of external agencies).

As for the territorial mapping, using a framework which matches size, market, interaction and agency effects with the five cluster typology:

- make a description of the cluster attributes for each dimension listed
- make a judgement of whether each attribute is a strength or a weakness. Also in this case, a 'rating scale' to apply a quantitative measure of how strong or weak can be used

3. Organisational Learning Arrangements Mapping

This exercise is designed to identify the infrastructure that exists to facilitate 'organisational learning' within the cluster; strengths that can be capitalised, and weaknesses or gaps that need to be addressed. The mapping exercise focuses on four dimensions:

- processes
- mechanisms
- actions
- actors

As with the other two exercises, using a framework matching the above listed dimensions:

- make a description of the cluster attributes for each dimension listed
- make a judgement of whether each attribute is a strength or a weakness. A 'rating scale' to apply a quantitative measure of how strong or weak can be used.

Step 2: **Establishing the cluster type linking cluster type to an appropriate 'organisational learning scenario'.**

This mapping exercise will provide sufficient data to enable a decision-maker to situate the cluster in one of the five cluster types identified by the DELOS project.

On this basis, and using the data generated by the environmental audit exercise, is possible to locate the cluster within the DELOS typology.

Step 3: **Linking the cluster to an appropriate 'organisational learning scenario'**

Generally speaking, a particular type of cluster will broadly be associated with a particular strategy that is intended to promote 'organisational learning' within the cluster. This exercise is intended to help decision-makers make a judgement on the overall 'learning scenario' that is appropriate for a given cluster type. The specific learning arrangements put into place within this broad learning scenario need to be informed by reflecting on the detailed results of the environmental audit (Step 1).

A 'learning scenario' defines an overview of the general pedagogic arrangements designed to facilitate collaborative learning, based on:

- the learning paradigm (whether transmissive - top-down; didactic pedagogic approach - situated - embedded in community values, agendas and interactions ; self-managed - based on loosely self-autonomous and self-organised approaches)
- key delivery systems - the mechanisms used to promote learning
- setting - the physical and organisational spaces in which learning takes place. Generally they are bounded (e.g. a central place such as a development agency)
- or unbounded (e.g. loose networking arrangements).

Step 3 is intended to help decision-makers arrive at an overall strategy or 'learning scenario' to facilitate collaborative learning within the cluster. In order to 'flesh out' this scenario, two further actions are required:

- developing the learning infrastructure
- identifying and developing learning content.

Appropriate learning infrastructure arrangements will be shaped by the results of the organisational learning mapping carried out in Step 1 above.

This will have identified:

- the existing infrastructure (training service facilities; informal networking structures) that can be capitalised on
- particular weaknesses of the learning infrastructure in the cluster
- gaps that need to be filled.

Appropriate content areas to promote organisational learning within SME clusters are informed by the implementation of a skills audit; this is composed of three elements:

- Organisational Learning Audit
- Domain competence audit
- Cross-job skills audit

These tools enable an appraisal to be made at the level of the SME and at an aggregated cluster level of:

- the relative representation and strengths of the types of 'organisational learning' elements identified by DELOS.
- skills gaps in relation to core domain skills (e.g. production techniques in the cluster sectors)
- skills gaps in relation to cross-job competencies.

The outcome of the audit depicts:

- the relative balance between information-gathering, knowledge acquisition and competence development
- any major skills and competence gaps

in order to help shape planning and decision-making.

ii) Elaborating a set of Guiding Principles aimed at enhancing the role played by clusters in developing training and employment support for SMEs. Since these principles need to be contextualised to the particular type of cluster in which they apply, the set of tools are intended to assess the type of cluster and make an audit of its strengths and weaknesses.

Principle 1: There is no evidence that 'organisational learnng', as reflected in collaboration between networks of SMEs sharing common geographical, cultural or operational spaces, is a universal phenomenon amongst European SMEs. Nor is there evidence that such 'aggregated learning' will in itself necessarily provide 'added value' for SMEs, in terms of outcomes such as human resource development, strategic market positioning and economic performance. Thus, training and logistical support policies and initiatives for SMEs need to be carefully targeted rather than generic, to take account of the varying structural features of SMEs, and the different types of learning behaviours they exhibit.

Possible actions:

a) Policy instruments developed by the European Commission, and member states to facilitate support for SMEs could be more tightly targeted to reflect the different configurations of 'cluster' and learning organisation. As an example, the Multiannual Programme for SMEs operationalises policies that aim to provide generic support in areas such as training and 'entrpreneurship'. However, the DELOS results suggest that training needs to be carefully targeted to the 'setting' in which SMEs operate, and that entrepreneurship can be an impediment as well as an asset to strategic decision-making and human resource development.

b) Training and labour market Observatories currently being developed through EU actions and initiatives, for example the LEONARDO Programme, could be used to capture, analyse and disseminate rich data on the number, characteristics and relative strenghts and weaknesses of European 'clusters'. These data could contribute to further development of the 'cluster typologies' developed through DELOS, and in the longer term to better targeting stratgeies for, for example, Structural Funds.

Principle 2: Three main constituent components of 'organisational learning' need to be targeted in relation to training and support policies: information-gathering; knowledge acquisition and competence consolidation and development. These components imply different training and logistical support capabilities, and should incorporate both provision of 'formal' services, together with actions designed to enhance informal networking arrangements..

Possible actions:

a) Regional development agencies are in the best position to take a leading role in promoting formal information gathering actions. This implies the development of distributed databases containing data on conferences; exhibitions; developments in technical state of the art.

b) Informal information gathering support is naturally within the remit of SME institutions, such as local Chambers of Commerce. Such networks would benefit from assistance to act as 'communication hubs' within a locale or cluster in order to facilitate better communication between local and their clients.

Principle 3: By extension, SMEs need to be made aware of the need to balance these three different components in their human resource development planning and management. At present, SMEs are relatively active in knowledge acquisition activities, but not in lower-level market intelligence gathering or higher level competence development.

Possible actions

a) Awareness-raising campaigns, through policy instruments currently available to the European Commission and member states, aimed at encouraging small firms to consider these aspects of learning.

b) Incorporation of the three-stage model of 'organisational learning within the 'action lines' of Research Programmes and other actions implemented by the Commission.

c) Curriculum development and marketing policies of training support services by regional agencies and SME institutions (for example the UK 'Training Enterprises Councils'), to reflect the different components of learning.

Principle 4: The entrepreneur is a pivotal figure in decision-making, but the evidence suggests that a large proportion of SMEs are in 'crisis management' rather than pro-active learning situations. Since entrepreneurial decision-making styles are closely associated with such crisis-management, there is a need to encourage SMEs to adopt a more participative style of collective learning.

Possible actions:

a) As with Principle 3, awareness-raising campaigns, through policy instruments currently available to the European Commission and member states aimed at encouraging entrepreneurs and key decision-makers in SMEs to consider 'alternative' forms of decision-making and human resources strategies.

b) SME organisations and local training providers to develop and run training support services aimed at providing key decision-makers with the management skills necessary to support strategic management and human resource development.

Principle 5: Microenterprises and new start-ups are particularly prone to 'crisis-management', and the lack of a coherent organisational learning strategy. Since this situation is almost certainly associated with lack of resources, it would suggest the need for support services that can provide pooled resources for SMEs.

Possible actions:

a) At the European level, such services might take the form of Labour Market or Sectoral Monitoring observatories that are can provide resource services open to individual SMEs. These services could provide on-line information on, for example, local course available; key contacts; intelligence reports and links to on-line libraries.

b) At the local level, SME organisation networks and regional agencies could provide the focal point for local resource centres providing libraries, databases of training course and providers and similar facilities to European-wide support centres.

Principle 6: There would appear to be significant gaps in the skills capabilities of European SMEs. Small firms tend to concentrate their efforts in developing and enhancing production-based skills, but there is a clear lack of competencies in marketing, and in cross-job skills that particularly needs to be addressed. SMEs appear to operate in general in highly localised rather than sectoral labour markets, which, as the DELOS field work confirms, means they tend to buy in new staff rather than train people. In turn, training appears to be geared to short-term and firm-specific objectives.

Possible actions:

a) Awareness-raising campaigns at European and member state level to encourage awareness of 'skills standards' issues, particularly in the area of cross-job competencies.

b) Incentives (in the form, for example, of training subsidies) through European Structural and Social Fund actions, and other Programmes to develop the training infrastructure to address these 'skills gaps' and to encourage SME employers and employees to develop their skills base. However, this does not imply that the skills and employment development of SMEs would be met by raising the general level of skills in the working population as a whole.

c) Regional agencies and SME organisations and training providers to target and market courses in these areas.

Principle 7: Training and support policies for SMEs need to address the lack of expertise, and practices, in skills auditing amongst SMEs, their support organisations and regional development agencies.

Possible actions:

a) At European and member state level, policies and policy instruments to encourage the spread of a 'skills evaluation culture' and work towards providing the expertise and tools to support continuing skills evaluation by small firms.

b) Development of action lines in European RTD&D Programmes to precipitate advances in state of the art in skills standardisation frameworks and approaches; content models for skills capture and competence definition; skills auditing tools and methodologies.

c) Regional development agencies as part of their key objectives and tasks to carry out routine skills auditing and monitoring exercises within local clusters.

Principle 8: The DELOS results reinforce the need for a European Skills Accreditation System, as outlined in Objective 1 of the White Paper on Education and Training. However, such a system needs to be attuned to the particular features and needs of SMEs. It would therefore need to: capitalise on the extensive use of informal learning networks (on the job training; mentoring etc.) used by SMEs.

Possible actions:

a) Policy instruments at the European and member state level to encourage local clusters to act as the 'hub' of a European Accreditation system. This could imply incentives to develop local network centres (such as Chambers of Commerce) as central points for providing on-line assessment and accreditation to SMEs.

b) Encourage SME institutions to create awareness about the value of capturing on-the-job experience within SMEs; to provide competence standards that are contextualised to their local 'cluster' and to act as administrative and management foci for the accreditation of such 'informal' competence development.

2. Background and objectives of the project

DELOS is a project dedicated to SMEs.

The importance of small firms to the contribution of employment growth in the next few years is decisive. However, the possibility for these enterprises to continue being competitive and to generate employment within the global market, depends on their ability to combine flexible production with the continual innovation of products and production process. In order to achieve this, investments must be made which are beyond each company's means.

The development of forms of co - operation between enterprises is a fundamental strategy for SMEs, capable to reach goals which would not be obtained by the single enterprise. Co-operation optimise costs, favour the exchange of know-how, makes easier the access to strategic information, support learning dynamics.

Often SMEs organisationally take on the characteristics of cluster. Within the cluster there is a strong integration between local institutions, service centres, training organisations and enterprises.

The SMEs clusters can act as a learning organisation. It is the aggregation of SMEs on the whole which reacts to challenges of change by adapting in terms of: technological professional updating; new professional skills; new service needs; new market strategies.

Each member of the cluster (enterprises, public bodies, training institutions, etc.), plays a role in identifying the training, organisational and information needs, in developing training programmes, in accomplishing them and in assessing them.

Considering the **"**clusters" as a learning organisation permits, methodologically, to analyse and model the information flow and the interactions which, in the cluster, give rise to circular processes of competence acquisition, shared know-how, experimenting and progressive correction of collective intervention.

As a consequence, the DELOS project intended:

- to verify the modalities through which the SME clusters intervene as learning organisation and investigate the organisational learning processes that arise through clustering;
- to give working indications capable of supporting training and occupational policies in favour of SMEs

The conceptual starting points of DELOS were:
often the SMEs organisationally take the characteristics of cluster, that is a group of enterprises:

- *mono – sectorial*
- *geografically contiguous*
- *functionally integrated*

within the cluster there is a strong integration between local institutions, service centres , training organisations and enterprises

Thus the **hypothesis** was that considering such a cluster as a 'learning organisation' permits – methodologically – to analyse and model the information flow and the interactions which , in the cluster, give rise to circular processes of competence acquisition, shared know – how, experimenting and progressive correction of collective intervention.
The main part of the activities carried out within the DELOS project were on-the-field work: i) a common baseline survey involving over three hundred of European SMEs which represent an interesting pool of information about SME cluster behaviour and orientation toward learning; ii) 12 case studies based on a common methodology and research tools. The aim being to verify how SMEs cluster behave on the ground and in which way the learning processes present in each cluster should be analysed as a mean of transmission of knowledge and competencies able to improve the cluster's competitiveness.
As far as any re – orientation occurred during the lifetime of the project is concerned, is to mention that – in the framework of DELOS - the **two key concepts** – cluster of SMEs and learning organisation/organisational learning – represented the main steps of an iterative heuristic process aimed at (re)shaping definitions and deepening meanings in order to come to a common (and shared) perspective (both at theoretical and methodological level) .
Finally, one of the objectives of the DELOS project was also to develop effective team work attitudes within the Consortium itself .

3. Scientific description of the project results and methodology

MAIN STEPS OF THE DELOS PROJECT: THE PROJECT STRUCTURE

The project was organised in 3 main phases (corresponding to work packages and tasks):

1. Methodological outline comprising of the following tasks:

1.1 *scouting activity:* which output was a internal report containing a comparative review, a synoptic sheet, the drafting of the "shared" version of cluster and learning organisation and a phenomenological description of 35 real cluster

1.2 *construction of the analysis methodology*: which output was a methodological framework providing a conceptual framework, methodological options, methodology design tools and an action plan;

1.3 *identification of the survey areas* : which has lead to the final selection of the 12 cluster to be analysed .

2. Field survey comprising of the following tasks:

2.1 *analysis of the socio - economic characteristics* of the selected 12 clusters: which output was – for each cluster – the description of : (i) socio – economic context; (ii) environmental audit; (iii) learning infrastructure;

2.2 *identification of the subject to be interviewed*: that is a methodological plan for each cluster aimed at choosing - from a given set - the most appropriate survey instruments for the analysis of the cluster (face-to-face interviews, focus group etc..) and identifying the subject to be interviewed;

2.3 *interviewing and national reporting*, comprising of the following main activities : (i) drawing up a ***standardised questionnaire*** for the baseline survey; (ii) determination of the SMEs sample for the baseline survey; (iii) realisation of the baseline survey; (iv) baseline data collection, data entry and elaboration; (v) drawing up a ***template***, providing the guidelines for drawing up the case study report; (vi) realisation of the report on 12 case studies;

2.4 comparative reporting , comprising of : (i) cross statistical elaboration of the baseline survey results; (ii) an overview of the case study results; (iii) a first cluster taxonomy combined with policy options.

3. Modellig: reference models identification and suggestions which provides a bridge between the case study work and the DELOS final report aimed at identifying:

3.1 a conceptual framework within organisational learning in SME and SME clusters can be depicted and understood and a set of practical tools and guidelines to assist policy and practice–oriented actions to support training and employment within the SME sector.

The absolute novelty of the attempt to combine – by means of a targeted research activity - the notion of cluster as a learning organisation (in an European perspective) was constantly keep in mind by the partners and was one of the most challenging tasks for the project leader.

§ § §

The results and goals achieved in each phase of the project

A first step to gather information comprised the development of a checklist to describe various types of clusters of SMEs and different LO/OL approaches, which allowed:

i) an in - depth analysis - with a transnational perspective - of the "notion" of Cluster and Learning Organisation

ii) a phenomenological description of 35 real clusters, comprising 9 items:

1. *Title/subject*
2. *Geographical location*
3. *Main link*
4. *Background*
5. *Actors*
6. *Know-how and communication*
7. *Additional information*
8. *Sources of information*
9. *Feasibility of further research*

Each item intended to form one section in the descriptions of the clusters; items 2 - 5 could be considered as:

2. *where (area)*
3. *how (link)*
4. *why (background)*
5. *what (actors).*

The item 6 *'know-how and communication'* intended to be a first step to link clusters of SMEs and learning organisations.

The complete list of the clusters provided was as follow:

- (I), selection and description of 10 'spontaneous' cluster (mainly industrial districts) and description of 2 so called "induced clusters" (identified as S&T parks and Business Innovation Centres or Industrial support structures)
- (NL), selection and description of 4 clusters
- (UK), collection of primary data on 5 different kinds of clusters each one provided with a phenomenological description
- (AT), selection and description of 3 clusters
- (F), selection and description of 2 clusters
- (ES), selection and description of 2 clusters .

The main purpose of this task (1.1) was to provide a framework which would allow a more or less standardised input - descriptions of each identified cluster - from the different areas . The intention was to define the items of a checking list broad enough to allow the inclusion of a wide range of types of clusters of SMEs.

This heuristic path – a mean to attuned the divergent views and interpretations of the concept and the differences in quality of information - progressively led to the recognition of some general strands in what is understood by the notion of cluster of SME in the framework of DELOS:

1. clusters based on a group of spatially concentrated enterprises in one particular sector;
2. clusters based on a group of enterprises as (regional) industrial complexes, with a backbone of large enterprises as the main clients of the enterprises;
3. clusters based on a group of SME that are part of support structure based on facilities that are specifically set up to stimulate (regional) economic activity.

A first attempt to categorise these clusters - on the basis of their main "perspective" – was as follows:

a sector-geographical perspective;
a technological-economic perspective;
a support perspective.

The intense debate within the project finally reached the result that , in the DELOS framework, we can talk about cluster if:

- SMEs are the dominant element
- the SMEs have commonalties in doing business in a competitive edge
- there is a manifested or implicit co-operation acting within the cluster (among the SME and the SME and the other actors)
- the territorial boundary is well defined ("territoriality") and plays a fundamental role.

§§§

Regarding the second DELOS key concept (Learning Organisation/Organisational Learning), on the basis of the synthesis of various contributions, it was possible to identify a number of overlapping domains that form a starting point for a methodology to analyse clusters of SME .
The L.O. is a concept that is becoming an increasingly widespread philosophy in modern companies, from the largest multinationals to the smallest ventures. What is achieved by this philosophy depends considerably on one's interpretation of the concept and commitment to it. L.O. has acted as an 'umbrella' concept for many different approaches, starting from a more or less shared vision on organisations and the role of learning. Ideas and experiences are being exchanged world-wide, in formal and informal networks.

The preliminary analysis was focused - at national level - on the following items:

- **definitions of LO**. A number of elements can be found - explicitly or more implicitly - in practically each definition:
  - *learning is not limited to traditional training (formal, structured learning), but it is integrated in all processes the organisation is involved in (problem centred and context related);*
  - *learning is permanent and includes all members of the enterprise;*
  - *learning of the organisation ('organisational learning') is central, not individual learning;*
  - *learning is considered to lead to continuous organisational improvement.*

- **background of the concept**. The underlying cause for recent emphasis on organisational learning is because of the increased pace of change. Classically, work has been thought of as being conservative and difficult to change. Learning was something divorced from work and innovation was seen as the necessary but disruptive way to change. The corporation which is able to quickly learn and then innovate their work will be able to change their work practices to perform better in the constantly changing environment.

- **organisational learning**. Regarding this item, the various contributions of a selected number of authors were analysed. Cyert and March[2] used the term organisational learning for the first time in the early 1960s. Theoretical considerations appearing in the 70s and 80s built on their starting point, i.e. that organisational learning appears when the organisation as an actor is responding to environmental changes in an effective way[3].

In 1963, Cyert and March put forward two central processes in their approach to organisations:
- *the way in which an organisation reacts to changing environmental circumstances; and*
- *the way in which decision-making processes allow leeway for the organisation itself to change.*

Their basic premise is that the knowledge of an organisation is partly stored in the decision-making processes and rules. The development and adjustment of a particular system of rules and procedures is described by them as the learning-process of the organisation.

The field of organisational learning has been characterised by a wide diversity of opinions, definitions and conceptualisations[4]. Reviewing the literature, Fiol and Lyles (1985)[5] noted that despite the broad variety of positions, three areas of consensus existed regarding organisational learning:

- the relevance of environmental alignment. In pursuing long term survival and growth, the organisation must align to its environment in order to remain competitive and innovative;
- the distinction between individual and organisational learning. The nature of the relationships between both is far from clear; more work is necessary, both in a theoretical and empirical dimension. Some authors strongly support the idea of organisational learning happening through the individual organisation members (individuals as agents of organisational acting and learning)[6]. Others say that this does not satisfactorily explain how communicable, consensual knowledge can be developed. In doing so, they re-affirm the importance of taking the organisation and its structure as the agent of the process[7];
- the presence of four key contextual factors in the learning process, i.e. culture, strategy, structure and environment. Despite the relative consensus on the labels of the factors, each label contains considerable diversity.

2 Cyert, R.M.; J.G. March (1963), *A behavioural theory of the firm,* New York, Prentice-Hall, Englewood Cliffs.

3 Hancké, C.; M., Leys (1991), *Veranderen om te leren, leren om te veranderen,* in: Roffelsen, J.B.M. and F. Kluytmans, *Organiseren met gevoel of organisatieverandering anders,* pp 33-46, Kluwer bedrijfswetenschappen/Open Universiteit Heerlen.

4 See e.g. for an overview of definitions: Dixon, N. (1994), *The organisational learning cycle. How we can learn collectively,* Mc Graw Hill Developing organisations series, Series Editor M. Pedler, London.

5 Fiol, C.; M. Lyles (1985), *Organisational learning,* in: Academy of Management Review, 10, pp 803-813, referred to in: Nicolini, D.; B. Meznar (1995), *The social construction of organisational learning: Conceptual and practical issues in the field,* in: Human Relations, Vol. 48, n7, pp 727-746.

6 See e.g. Hedberg, B. (1981), *How organisations learn and unlearn,* in: Nystrom, C.; W. Starbuck (Eds), Handbook of organisational design, London, Oxford University Press; Klein, J. (1989), *Parenthetic learning in organisations: Toward the unlearning of the unlearning model,* in: Journal of Management Studies, 26, pp 291-308; Dogson, M. (1993), *Organisational learning: A review of some literatures,* in: Organisation Studies, 14, pp 375-394.

7 See e.g. Cyert, R.; J., March (1963), *A behavioural theory of the firm,* Englewood Cliffs, N.J.: Prentice-Hall; Levitt, B.; J. March(1988), *Organisational learning*, in: Annual Review of Sociology, 14, pp 319-340; Lant, T.; S., Mezias (1990), *Managing discontinuous change: A simulation study of organisational learning and entrepreneurship,* in: Strategic Management Journal, 11, pp 147-179.

One of the reasons for such a variety of perspectives can be found in the work of Huber (1991)[8] in which he suggests that organisational learning is composed of at least four different processes:

1. knowledge acquisition;
2. information distribution;
3. information interpretation; and
4. organisational memory.

Each of these processes is composed of a number of sub-processes. Thus, when one talks about organisational learning, one may be talking about several different levels or different dimensions of the same construction. Huber's classification summarises previous organisational learning work according to the processes investigated.

A similar classification can be found in the four steps of Dixon's (1994)[9] organisational learning cycle:

- the widespread generation of information, which encompasses both the collection of external data and the internal development of new ideas, including process and product;
- the integration of new/local information into the organisational context;
- the collective interpretation of information;
- having the authority to take responsible action on the interpreted meaning.

Dixon assumes that organisations will learn effectively via a cycle, much in the same way as is assumed that individuals learn in a cyclic process. Yet, in organisational learning, the cycle is more complex: it involves multiple stakeholders and necessitates inter-company dialogue to collectively interpret organisational action and information.

Learning, knowledge and information
By many scholars, the transformation from tacit to explicit knowledge is seen as an important condition for organisational learning to take place. In an interview, Karash (1995)[10] explains this transformation in the following way: 'Knowledge is about application of that information in real experience. So knowledge, for us, is the ability to do. Therefore, learning is increasing our ability to produce results.
Tacit knowledge is when you can do it, but you can't describe it. Explicit knowledge is "how to" information that is put into tangible, formal language.
This might be a procedures manual or the content of a training course or the briefing that a good coach would give a subordinate. Now, in this equation, explicit knowledge is always incomplete because you don't really know how to do something until you've practised it – at least for the important things. Tacit knowledge is necessarily incomplete because it would be real hard to transfer to anybody else.
The combination of tacit and explicit means that you can both do it and you can convey a substantial part to someone else who then, with practice, internalises it. It is clear to me that organisations everywhere have a tremendous amount of tacit knowledge. This is in the heads and bodies of the workers. Organisations also have a certain amount of explicit knowledge where they have codified how to do something.'

8 Huber, G. (1991), *Organisational learning: The contributing processes and the literature,* in: Organisation Science, 2(1), pp 88-115.

9 Dixon, N (1994), *The organisational learning cycle. How we can learn collectively,* Mc Graw-Hill, Developing organisations series, Series editor M. Pedler, London.

10 The Learning Enterprise (1995) Leading lights: an interview with Richard Karash of Innovation Associates, on ***www*** ***

Different authors (for instance Senge, 1994; Isaacs, 1993[11]) point to the discipline of dialogue as being central to organisational learning.

Isaacs (1993) defines dialogue as a: *'sustained collective inquiry into the processes, assumptions, and certainties that compose everyday experience'.*

Dialogue is seen as a reflective learning process. The theory of dialogue[12] suggests that breakdowns in the effectiveness of teams and organisations are reflective of a broader crises in the nature of how human beings perceive the world. Bateson[13] used the term 'learning III' to describe the form of learning about the context of learning. If Argyris and Schon's double-loop learning answers the question '*What are alternative ways of seeing this situation that could free me to act more effectively*'?, triple-loop learning would answer the question '*What is leading me and others to have a pre-disposition to learn in this way at all? Why these goals?*'. Triple-loop learning is the learning that opens inquiry into underlying '*why's*'. The discipline of dialogue might open up a new horizon for the field of management and organisational learning:

- dialogue is an advance on double-loop learning processes and represents triple-loop learning; it involves learning about context and the nature of the processes by which people form their paradigms, and thus take action;
- the field suggests a new range of skills for managers that involve learning how to set up environments or fields in which learning can take place;
- this discipline stresses the power of collective observation of patterns of collective thought that typically speed by us or influence our behaviour without our noticing;
- dialogue is an emerging and potentially powerful mode of inquiry and collective learning for teams.

Senge (1991) sees dialogue as a 'group of people who talk with one another often enough and long enough so that they actually start to think together in a very creative way'[14].

Single, double and triple-loop learning

Organisational learning is collective learning; collective learning leads to organisational change. Swieringa and Wierdsma (1990)[15] relate this organisational change to single, double and triple-loop learning. At the level of single-

[11] Isaacs, W.N. (1993), *Taking Flight: Dialogue, Collective thinking, and organisational learning,* in: Organisational Dynamics, Autumn, pp 24-39.
Isaacs is the founder and director of the MIT Dialogue Project. In the framework of this project, action research experiments on dialogue and organisational learning have been conducted.

[12] 'Dialogue' draws on the work of mainly three thinkers (see Senge, 1994 - p359):
- the philosopher Buber who used the term to describe a mode of exchange among human beings in which there is a true turning to one another, and a full appreciation of another not as an object in a social function, but as a genuine being. (Buber, M. (1988), *The knowledge of man,* Atlantic Highlands, N.J., Humanities Press International).
- the psychologist De Maré who suggested that large group socio-therapy meetings could enable people to engage in understanding and altering the cultural meanings present within society. (De Maré, P., (1991), *From hate through dialogue to culture in the large group,* 1st ed., London, Karnac Books).
- the physicist Bohn suggested that this new form of conversation should focus on bringing to the surface and altering the tacit infrastructure of thought. (Bohn, D. (1985), *Unfolding meaning,* Loveland, Colo.: Foundation House).

[13] Bateson, G. (1972), *Steps to an Ecology of Mind,* New York: Chandler, Publishing Company, 1972.

[14] Training and Development (1991) The Learning Organization Made plain - An interview with Peter Senge, in: *Training and Development,* October 1991

loop learning, changes occur in rules which is collective learning at the level of 'be able to'. This level of organisational change leads to improvements.
At the level of double-loop learning, changes occur in insights underlying the rules (theories, reasoning, etc.); which is collective learning at the level of knowing and understanding together. Changes lead to renewal.
Triple-loop learning is related to changes in the shared principles on which each organisation is based: what kind of organisation do we want to be, what contribution and role do we want to play, which values are important? Collective learning happens at the level of 'daring, wanting and being'. This form of change is about development.

Ciborra(1994)[16] analyses the learning loops starting from the idea of learning as strategic business:

- 1st loop of learning: work practices (specific / situated knowledge of a context: consolidated professional legacy of the organisation; routines);
- 2nd loop of learning: capabilities (competencies that represent the know-how of an organisation, the relevant know-how for efficient problem solving);
- 3rd loop of learning: core competencies that guide the opening of the market and offer a competitive edge to the organisation;
- 4th loop of learning: manifests itself in the training context of the organisation and presides over the elaboration of the business mission and strategy.

Tomassini (1994) identifies six elements/'processes' outlined by the author as a framework for the analysis of and intervention in the learning organisation processes[17]:

1. *learning by doing* - both formal, such as rules, procedures, conventions and informal, such as beliefs, frameworks, paradigms (in the first case routines embody codified knowledge while in the second one tacit knowledge: they "store" the memory of the organisation);
2. *knowledge sharing;*
3. *translating knowledge into competencies and successful outcomes;*
4. *integrating explicit and tacit knowledge*[18];
5. *acquiring external knowledge* - the learning organisation is able to reduce the boundaries with the external environments and to match the acquisition and the production of formal knowledge with all the other types of knowledge that are useful for its development (e.g. benchmarking and market information);
6. *implementing knowledge-based strategic approaches* - from adaptive kind of learning to a generative one.

- **disciplines of L.O**. A certain extent of consensus can be found on the 'domains' that together form the basis for LO. For these domains, authors use different labels and headings.

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15 Swieringa, J., and A.F.M. Wierdsma (1990), *Op weg naar een lerende organisatie. Over het leren en opleiden van organisaties.* Wolters Noordhoff Management, Amsterdam.

16 See: Viteritti, A (1995) Percorso ragionato nella letteratura: dimensioni, modalità e sviluppo dell'apprendimento nelle organizzazioni: conference on *Organisational Learning and managerial practice*, Rome 1995

17 Adapted from contribution IGT

18 Tommasini sees the knowledge 'spiral' as a key notion for this integration. The steps of the knowledge "spiral" include:
- from tacit to tacit : socialisation processes
- from tacit to explicit: externalisation processes
- from explicit to tacit: internalisation processes

One of the leading authors in the field of LO, Peter Senge, established a point of view on learning organisations that serves as a reference point for many people in his well-known best seller 'The Fifth Discipline - The Art and Practice of The Learning Organisation'[19]. The perspective that was chosen to bring together different inputs in the field of LO was a set of disciplines[20].

A discipline is a body of practice, based on some underlying theory or understanding of the world, which suggests a path of development. According to Senge, disciplines are about 'changing our patterns of thinking and interacting so that learning can be a way of life rather than an episodic event'[21].

The following five disciplines of the LO are distinguished by Senge (1991)[22]:

1. Systems thinking;
2. Personal mastery;
3. mental models;
4. Shared vision;
5. Team learning.

t Systems thinking .

Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snap-shots'. It is a set of general principles – distilled over the course of the twentieth century, spanning fields as diverse as the physical and social sciences, engineering, and management.

Systems thinking teaches how to see things as wholes. Systems language is a way of expressing ideas that subtly retrains the sub-conscious to structure data in circles rather than straight lines. Systems thinking is more than a problem solving methodology It does away with boundaries that we invent and then find ourselves trapped inside of.

Why apply systems thinking to business organisations? Because it can keep them from being overwhelmed by complexity, the kind that causes people to say, "there is nothing I can do. It's the system".

t Personal mastery

Mastery refers to a special of proficiency. "*Personal mastery is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively*". Its roots lie in Eastern and Western spiritual traditions, and in secular traditions. Personal mastery is the discipline that connects personal learning and organisational learning.

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t from explicit to explicit: combination of ready information and knowledge

19 Senge, P. M. (1990), *The Fifth Discipline - The Art and Practice of The Learning Organization*, New York, Doubleday

20 Senge P.M. (1990) The Leader's New Work: Building Learning Organisations, in: *Sloan Management Review*, Vol.32, Nr.1, Fall 1990, pp.7-23

21 Training and Development (1991) The Learning Organization Made plain - An interview with Peter Senge, in: *Training and Development*, October 1991

22 Training and Development (1991) The Learning Organization Made plain - An interview with Peter Senge, in: *Training and Development*, October 1991

t Mental models

"*Mental models are deeply ingrained assumptions, generalisations, or even pictures or images that influence how we understand the world and how we take action*". In organisations, such mental models control what people perceive can or cannot be done. Change rarely takes place until management teams change their shared mental models. This section of the book tells how to unearth mental models and open them up to influence.

t Shared vision

In an organisation, a shared vision binds people together around a common identity and a sense of destiny. A genuine vision causes people to do things because they want to, not because they have to.

The discipline of building a shared vision is something like the act of creating a sculpture from a block of stone. The vision builders uncover "pictures of the future" that are common to all organisational players and that inspire commitment.

t Team learning[23]

Team learning is a tool for raising the collective IQ of a group above that of anyone in it. Through team learning, the whole becomes smarter than the parts. The disciplines of team learning include dialogue, a form of talking and thinking together. One aspect of this discipline is to recognise and overcome patterns of defensiveness that undermine group learning.

Senge says team learning is vital because *'teams, not only individuals, are the fundamental learning unit in modern organisations; unless the team can learn, the organisation cannot learn'.*

Working and learning has become a key element in literature on building LOs. Teams in various forms have become widespread ways of working. As task forces, committees, work groups and quality circles, they are used to provide leadership, accomplish research, maximise creativity and operationalise structural flexibility (Payne, 1988)[24]. Most models of the organisation of the future – networks, clusters, non-hierarchical, horizontal, etc. – are premised on teams. This does not mean that individual performance or accountability becomes less important. Rather, the challenge for management increasingly becomes that of balancing the roles of individuals and teams versus displacing or favouring one over the other.

Below, a number of contributions on teamwork and team learning are briefly presented to give an impression of the type of views and know-how within this discipline of the LO.

[23] For a more elaborated review on literature on teams and teamwork, see: The organisation of work - teamwork by Dominique Danau, ECWS. This text was written within the framework of the Work Based Learning project (1995), joint project carried out by ECWS and the Tavistock institute, commissioned by DG XXII, CEC

[24] Payne, R., (1988), *The effectiveness of research teams: a review* (Working paper n169) Manchester: Manchester Business School

In literature, different kinds of typologies can be found in relation to teamwork. One example of these typologies, is given by Shonk (1992)[25]. It is based on a typology construed by Lawler and Mohrman (1984)[26] built around the extent of autonomy that teams have. The underlying hypothesis is that 'the greater the amount of autonomy given to a team, the more likely it will affect the organisation's structure and processes'[27].

From low to high team autonomy:
Suggestion teams: are mainly temporary; the team has little decision-making or implementation authority; this kind of team (for instance, advisory committees) can be quite helpful when a large number of ideas are necessary.
Problem-solving teams (for instance, quality circles, inter-functional teams): are involved in identifying and researching activities and in developing effective solutions to work-related problems. Many of these teams are put together to recommend what the company should do on a given topic.
Semi-autonomous teams: have considerable input into the planning, organising and controlling of their daily work. They are used when the tasks can be best accomplished if employees have considerable freedom to act.
Self-managing teams: are responsible for managing their work on a daily basis. They are used when employees need freedom to act and where the co-ordination needs with other teams is either low or of such degree that the team can manage it.

Different books and articles have been written over the last couple of years about the competitive advantages of introducing teams in organisations.

In their book 'The wisdom of teams', Katzenbach and Smith (1993)[28] consider teams as the key to improving performance in all kinds of organisations. Yet, they say, today's business leaders consistently overlook opportunities to exploit their potential, confusing teams with teamwork[29], empowerment[30] or participative management.
The authors see a focus on team performance today because of the link between teams, individual behavioural change and high performance. Few people today question that a new era has dawned in which such high levels of performance depend on being 'customer driven', delivering 'total quality', 'continuously improving and innovating', 'empowering the workforce' and 'partnering with suppliers and customers'. The authors believe that teams will play an increasing part in first creating and then sustaining high-performance organisations[31].

Tjosvold (1991)[32] sees teamwork as a critical competitive advantage because potential competitors, though they may have deep pockets to buy the latest computer and production technology, cannot buy and put teamwork in place.

Shonk (1992)[33] states that "Traditional organisational structures and processes often work against effective interdependency by focusing on individuals and tightly bound functions or units. New structures and processes must

25 Shonk, J.H., (1992), *Team-based organisations. Developing a successful team environment*, Business One Irwin, Illinois
26 Lawler, E.E. and S.A. Mohrman, (1984), *Quality of Work Life*, unpublished manuscript.
27 Shonk argues that organisations that started installing suggestion and problem-solving teams and quality circles in the late 70s and 80s are beginning to move towards a higher level of team autonomy, which is to him a natural progression taken into account the external marketplace pressures to adapt quickly to remain competitive.
28 Katzenbach and Smith, (1993), *The wisdom of teams: creating the high-performance organisation*, Harvard Business School Press, Boston, Massachusetts, USA. They define a team as a "small number of people with complementary skills who are committed to a common purpose, performance goals and approach for which they hold themselves mutually accountable".
29 Katzenbach en Smith (1993), p21: "A team is a small group of people with complementary skills committed to a common purpose and set of specific performance goals. Its members are committed to working with each other to achieve the team's purpose and hold each other fully and jointly accountable for the team's results. Teamwork encourages and helps teams succeed; but teamwork alone never makes a team. (...) Those who describe teams as vehicles primarily to make people feel good or get along better not only confuse teamwork with teams, but also miss the most fundamental characteristic that distinguishes real teams from non-teams, a relentless focus on performance".
30 See for instance Mayo and Lank, (1994); Tjosvold, (1991)
31 See also: *Virtuele teams; working apart together*, (1995), in: Opleiders in Organisaties, Nieuwsbrief, 2, n4, pp 12-13
32 Tjosvold, D., (1991), *Team organisation. An enduring competitive advantage*, John Wiley and Sons, Wichester
33 Shonk, J.H., (1992), *Team-based organisations. Developing a successful team environment*, Business One Irwin, Illinois

be developed to more effectively manage a firm's interdependencies. Many firms are finding that team-based organisations are a very promising strategy for managing these interdependencies".

Manz and Sims (1993)[34] state in their book "That's what this book is all about – one of the most important organisational development to hit business since the industrial revolution: self-managing teams. Teams have the capacity to increase productivity and improve quality significantly, and are an important answer to the competitiveness challenge. Teams do work!".

Teams are considered as obvious vehicles through which learning can be transferred between individuals; for some it is perhaps the most common point at which individual learning starts to become organisational learning.

Team learning, however, remains poorly understood. So far, not much theory exists on how and when teams learn. Team learning is considered to be a team skill. A group of talented individuals will not necessarily produce a learning team[35].

Finally, according to Mayo and Lank (1994), there are three main facets of team working which increase the learning capability of an organisation:

- the transfer of knowledge and skills between individual members of a team with different background;
- the collective learning that a team goes through in working towards their common goal;
- the continuous learning that the team members experience in making teams more effective, in other words, process learning rather than content learning.

§ § §

Various partners in the DELOS consortium have reflected on the question how to apply the know-how in the field of L.O. to 'clusters of SMEs'. LO is generally approached from the perspective of human resources development (HRD). It therefore requires a radical and creative shift in thinking to apply LO to clusters of SMEs. DELOS was not particularly interested in the separate HRD policies and practices of the individual SMEs of a cluster: the project wanted to focus on the interactions between the actors in a cluster and the learning this provokes.

The cross – reading of the various national contributions led to the identification of several selected domains:

- *Orientation towards learning*

  Ways of structuring and dividing work in the cluster in relation to work based learning, recognition of competencies and qualifications, explicit and/or expressed commitment to learning, willingness to

[34] Manz, C.C. and H.P. Sims Jr., (1993), *Business without bosses. How self-managing teams are building high-performing companies*, John Wiley and Sons, New York

[35] Senge (1990) describes team learning as:

share success and failure, level of trust, availability of resources for experimentation, joint training initiatives, etc.

- *(Internal) communication*

  Systematic exchange of knowledge, dialogue, durable relationship, openness, implicit transfer of know-how (including informal communication, joint projects and internal cluster labour market), transparency in the cluster, cluster culture, mapping of information flows, use of information technologies, etc.

- *Role, function and perception of actors*

  Active and passive support of stake-holders (notably the entrepreneurs of the cluster), active participation in decision making processes, partnerships, identification with cluster, shared vision of actors in the clusters, use of information flows, learning needs, etc.

- *Interaction with the environment*

  Links to knowledge providers outside the cluster that provide, SWOT of the cluster, etc.

Again - the need of the Consortium being to 'convert' concepts and theoretical assumptions in methodologies and related tools for the field work – the learning processes were finally categorised into four main 'segments'(according to Massimo Tomassini[36])

To this extent, it was proposed to assume that learning processes are based on an idea of organisational learning as a complex phenomenon which can be articulated as follows :

a) **learning by doing and experience (LDE)**
b) **knowledge sharing (KS)**
c) **acquiring relevant external knowledge (AREK)**
d) **developing knowledge and competencies (DKC)**

Is to mention that each research activity carried out, was organised and realised with reference to a specific (and shared) methodology. In fact, in order to balance the two key - concepts the DELOS project was based on (SME clusters and Learning Organisation) and their different meaning in each national /local context -

"the process of aligning and developing the capacity of a team to create the results its members truly desire. (...). Individual learning, at some level, is irrelevant for organisational learning. Individuals learn all the time and yet there is no organisational learning. But if teams learn, they become a micro-cosmos for learning throughout the organisation".

[36] Tomassini M. (1991), Innovazione, apprendimento e formazione: un 'indagine empirica, Milano , Franco Angeli
Tomassini M. (1993), Alla ricerca dell'organizzazione che apprende. l'apprendimento organizzativo nel futuro della formazione continua, Roma, Edizioni Lavoro
Tomassini M. (a cura di) 1996 , Apprendimento continuo e formazione. Contributi sulle dimensioni organizzative, sociali e tecnologiche dell'apprendimento Isfol, collana Strumenti e Ricerca, Milano, Franco Angeli

all the activities needed to rely on an effective methodological framework (that is a set of guiding principles and tools for the field work.)

At this point of the project, the two conceptual frames of reference that are located at the heart of DELOS, were:

- the notion of 'clusters' as a valid categorical construct for mapping SMEs
- the notion of organisational learning as a meaningful operational dynamic for assessing and explaining the 'behaviour' of SMEs.

In many ways, these two conceptual frames were taken as given within DELOS, and there is an implicit assumption that the methodological approach to field work should be shaped in these terms. However, became clear both from the literature reviews carried out during the analysis of the learning organisational concepts and from partners' initial attempts to identify and map out the broad characteristics of clusters as 'candidates' for case study analysis that a critical review of these two frames of reference should themselves be part of the DELOS 'process of enquiry'.

A quote from Amin and Thrift (1994) underlines this point:

"In many cases we know very little about the institutional field of local areas; in some cases not even the most basic of institutional audits have been achieved. This is important because *the institutional field of an area cannot be defined a priori but must be defined on the basis of empirical investigation* (our italics). Fields only exist to the extent that they are institutionally defined. Still less can we claim to know much empirically about the strength or range of interactions between institutions in an area, the types of coalition that have resulted, or the construction of mutual awareness and common industrial agendas".

The main implication of this line of argument was that the DELOS field work needed to empirically verify its own rationale and the 'conceptual coherence' of the cluster model as well as looking at how SMEs behave on the ground. The key assumptions of this rationale were as follows:

- that SMEs collectively represent the dynamic engine of economic growth, and their aggregate actions are inherently transferable into aggregate economic benefits;
- that SMEs reflect structured patterns of interaction;
- that facilitating clusters of SMEs will allow diffusion of know how and innovation to be more efficient;
- that facilitating aggregate learning amongst SMEs will stimulate 'intentional' activity and decision-making and allow SME clusters to consolidate their market position or diversify into other markets;

- that the behaviour of large organisations can act as a role model towards understanding and shaping the collective actions of clusters of SMEs;
- that cluster models are transferable across socio-cultural and socio-economic boundaries (including both geographical and sectoral boundaries).

Starting from that rationale and from the conceptual coherence of the cluster model as a valid 'object of enquiry', it followed that :

1. *a case study methodology was likely to be the most effective and appropriate approach to field work. It should incorporate the application of multiple methods of data gathering and analysis, involving different permutations of participants and the application of different types of research questions, criteria and indicators within a range of settings*

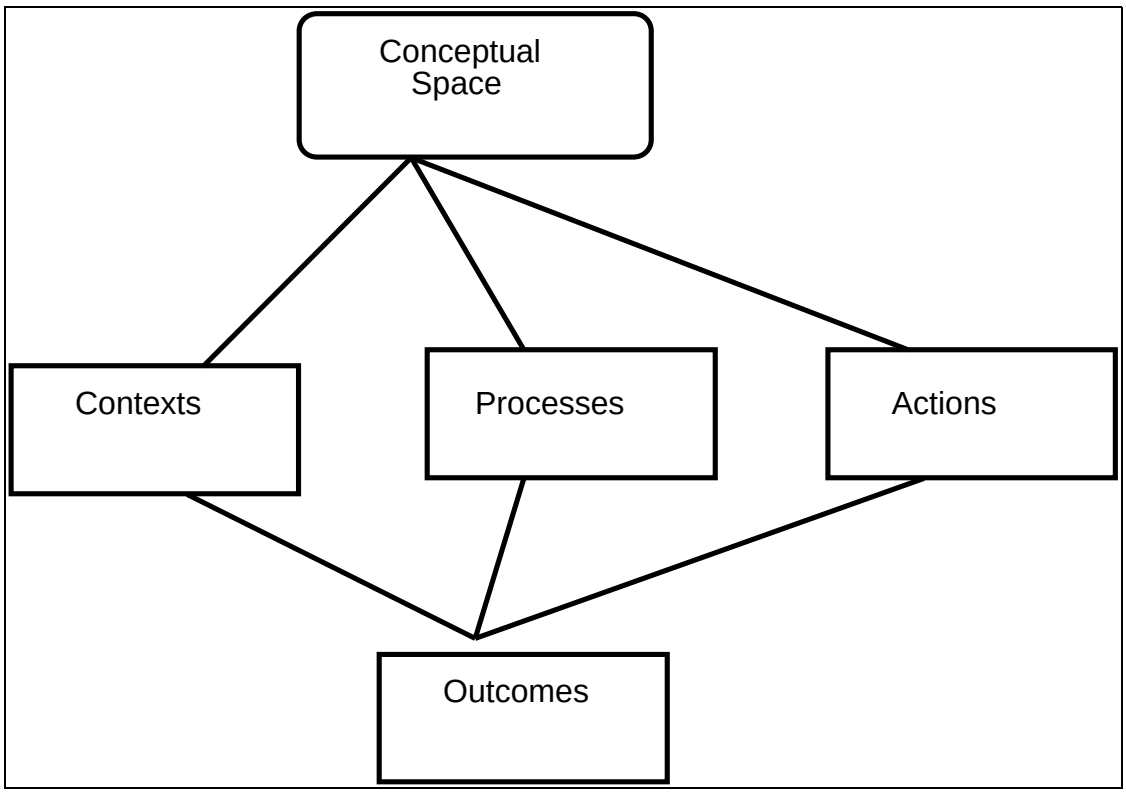
2. the 'cluster' was not the most appropriate 'unit of analysis' for data gathering and analytical purposes, because it imposes *a priori* assumptions that themselves need to be tested.

Therefore a case study approach was adopted incorporating the notion of 'open systems' as the over-arching operational frame of reference for field work, using 'the case' as a unit of analysis. As a starting position 'the case' was defined as a **loosely-bounded institutional field in which SMEs operate.**

Hence, the point of departure of the research was the definitions of clusters and learning organisations, and the *'short list*' of clusters proposed by partners. These clusters were subjected to a 'mapping exercise' in order to , firstly 'testing' the integrity of the clusters selected, and secondly providing an initial data collection process to shape the understandings of how the clusters operate.

The case studies allow for the exploration and testing of conceptual constructs as well as the analysis of data derived from observing, documenting and decoding the behaviours of actors. So the 'analytical space' in which the field work operates involves both 'thematic' as well as indicative case studies.

The Figure below represents schematically how this amalgamation of the thematic and the indicative looked like in relation to defining the main elements of the research.



In the Figure:

The **Conceptual space** represents the overarching theoretical understandings and assumptions about how SMEs operate as 'learning organisation clusters'. These assumptions were part of the 'object of enquiry' to be critically reviewed and empirically validated within the DELOS project. The main components of this conceptual space include:

- ***theories and models of social interaction*** - the ways in which actors within SMEs operate and the ways in which SMEs collectively interact

- ***theories and models of information and know-how and information and know how diffusion*** - what it is that is being transferred within and between SMEs and how that transfer process works

- ***theories and models concerning the positioning of SMEs within macro-economic structure and processes*** (for example in terms of current debates on globalisation-localisation)

- ***theories and models focusing on spatial and territorial perspectives, for example the role of SMEs in regional development.***

The three components labelled **contexts, processes and actions** denote reference points which reflect how these conceptual components are reified 'on the ground'.

Contexts refer to the ways on which the actions of SME clusters are shaped by their environment. The Context of SME clusters is defined in terms of:

- Firms embedded in socio-economic networks
- Firms embedded in a socio-cultural environment- values and culture of communities
- Territoriality and 'industrial milieu': the spatial and historical dynamics shaping the environment
- Organisational structures of the firm and cluster
- Institutional thickness- informal social constructions over time
- Learning arrangements

Processes define the ways in which clusters and their constituent components (firms and actors) interact within the clusters. They include the following:

- Knowledge creation processes (individual cognitive processes and internal organisational learning)
- Learning processes- evolution and adaptation of the territorial milieu to change
- Diffusion mechanisms and processes through which know-how evolves and is diffused
- Inter-organisational learning - how firms and actors exchange know how.

Actions and ***outcomes*** refer, firstly, to the ways in which individual actors, firms and clusters both shape and respond to processes within their socio-cultural environment, and secondly to the ways in which these actions can be interpreted and translated into policy. The kinds of questions that DELOS needs to address in relation to the actions of decision-makers both inside the clusters and in the wider policy world outside include:

- How do we know knowledge and learning is used?
- How is it embedded in organisational protocols and structures?
- Is there consensus about goals of networking?
- What are linkages with meso and macro outcomes (regional development; national/EC competitiveness)?
- What are the policy implications for organisational learning within SME clusters?

The research questions addressed by the field work need to do two things:

- firstly, they needed to reflect the key objectives of the DELOS project as a whole
- secondly, they needed to address the peculiarities of particular cases.

The key common research questions to be operationalised by the field work were as follows:

- what are the common characteristics of SME clusters (in terms of size of firm, organisational structure, operational environment, work force profile) and which characteristics are idiosyncratic to a particular environment

- in what ways are individual SMEs embedded within a cluster, both 'objectively' and 'subjectively' (are there institutional arrangements representing their interests? in what ways do managers of SMEs 'identify' with a cluster? do they see themselves as part of a community?)

- what are the economic, spatial and organisational forms that link SME clusters to a broader economic structure (what are the supply-demand mechanisms linking individual firms to each other? to larger regional, national and global economic organisations and processes?)

- what kinds of decision-making and business strategy 'forms' can be identified within SMEs?

- what kinds of knowledge are brought into play in decision-making? is know-how tacit and internalised or externalised and formalised?

- what kinds of information-seeking forms are represented within SMEs?

- how do SMEs establish their training and organisational needs, how are these needs met, and what are the economic cost/benefits of training?

- what are the patterns of information flows between SMEs within a cluster? how is know-how and competence transmitted?

- do SMEs exhibit competitive or collaborative learning strategies?

- what affective (unmet needs) for learning and training can be identified among SMEs? are there particular skill shortages that can be collectively addressed by training strategies?

These common research questions needed to be contextualised to the socio-cultural environment of individual clusters.

As indicated above, the case study approach calls for the application of multiple methods of data gathering and analysis, involving different permutations of participants and the application of different types of research questions within a range of settings. It entail the collection of both quantitative and qualitative data, including surveys, content analysis, statistical analysis of secondary data and observation, and the interpretative synthesis of these different data sources to provide an overall interpretation of each case.

To summarise, the methodological approach for DELOS field studies was :

- a common baseline survey across the cases, using generic questionnaire survey instruments (the baseline survey)

supplemented by:

- a mix of methods tailored to individual cases

followed by:

- interpretative synthesis of individual case study outputs to provide conclusions and policy recommendations across cases, using the 'case study summary pro forma' (that is the template which gave guidelines for drawing up the case study report)

§ § §

Summing up, on the basis of the scouting results the consortium strongly worked to define a methodological framework (which kind of field analysis, which tools, which models….) providing:

- ü a conceptual framework and underlying rationale for the approach specified;
- ü an outline of the methodological options, specifying the overall methodology, units of analysis, data capture methods
- ü a set of tools to develop an appropriate design frame and
- ü an implementation plan for conducting the field work

A case study methodology was chosen, as it was considered the most effective and appropriate approach to field work. It incorporates the application of multiple methods of data gathering and analysis, involving

different permutations of participants and the application of different type of research questions, criteria and indicators within a range of settings.

In choosing the methodological approach for the field work a mix was chosen, incorporating:

- ü base line survey (through a standardised questionnaire);
- ü a set of common research questions to be answered for all the case studies
- ü a template which gave guidelines for drawing up the case study report.

§ § §

As far as the **baseline survey** was concerned , a sample activity was carried out and a standard questionnaire was elaborated comprising of the following sections:

1. ***Details of the firms*** : (*what it does, how many employees etc.*.) whose objective was to collect general information
2. ***Company history*** whose objective was to understand how the firm has developed historically
3. ***Networks*** in order to analyse the kind of network existing between small businesses in the area and among businesses and the community as a whole
4. ***Learning processes*** in order to analyse the way in which the firm maintain and develops its skills, expertise and know – how

In carrying out the base line survey each partner was free to adopt the most appropriate approach to SMEs : in most case the direct interview was used, in other phone or mail interviews were used.

The baseline survey has been carried out on a sample of 323 enterprises belonging to 11 cluster out of the 12 on which DELOS Project analysis is based.

	IT 1 Brianza	IT2 Biella	IT3 Mirandola	IT4 Prato	UK1 Asian Family	UK2 TECs	AT Styria	ES1 Machine Tool	ES2 Automotive	FR1 Jura - Toys	FR2 Reflex' Oise	Total
Questionnaires planned	42	42	28	42	15	42	38	29	35	19	42	374
Questionnaires completed and 'valid'	42	39	21	27	16	42	37	22	27	19	31	**323**

This sample counts for 86.4% of the original one, due to some interviews missing in some of the clusters; nevertheless, after re-weighting the results per cluster and per total, the data can be considered as representative both of each cluster examined and of the "cluster of clusters", i.e. the total of enterprises located in the 11 cluster analysed.

The **distribution of enterprises** according to the main sector of activity reflects the structure of the clusters themselves: 20% of the total belong to the textile and clothing (due to the presence of Prato and Biella, infact two out of four Italian cluster belong to this sector), 15% electromechanical (which the Spanish and Austrian clusters can be referred to), 10% furniture (the Italian Brianza cluster), 23% other manufacturing enterprises (for instance, "toys" in Jura cluster for France).

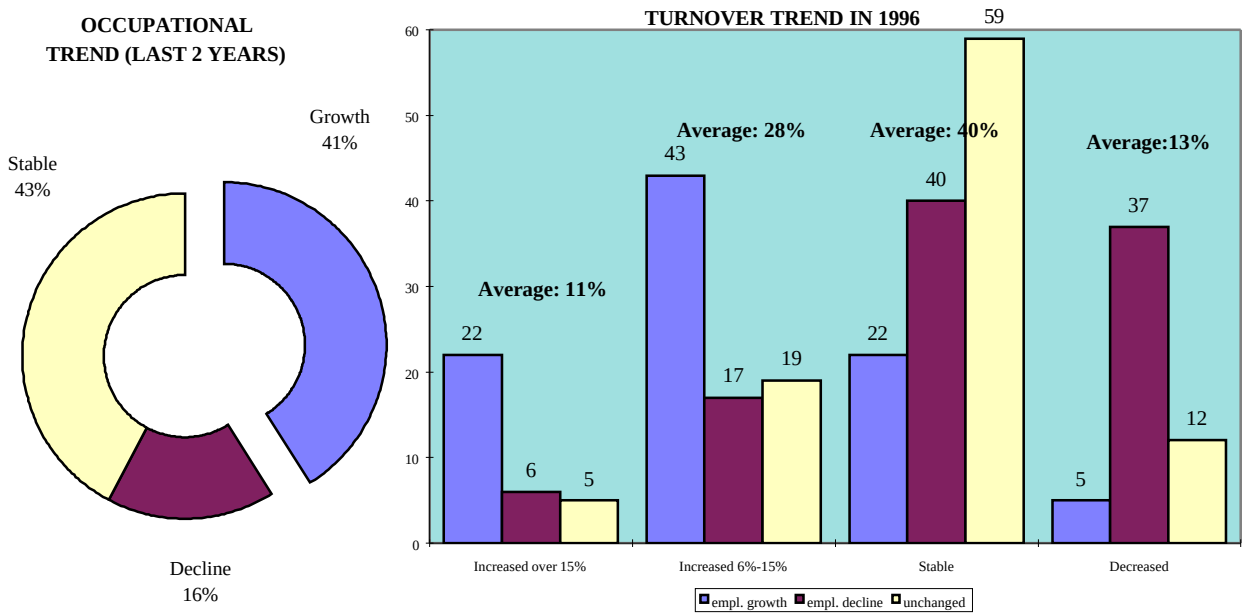
The **"historical roots"** of the clusters can be inferred from the average age of the enterprises (in Brianza, Biella, Prato and Jura most firms started up before 1970, whereas the British clusters date back to the late '80s) and, as a consequence, from the size in terms of employees (much higher than average in Biella and Jura, but also in the Spanish automotive components cluster). As most of the systems of SMEs, a negative correlation can be found between size class and age: the younger the firm is, the smaller number of employees it has.

The 11 clusters have recorded a **growth trend** in 1996, both in terms of turnover and occupation. Even if there are no comparable data as far as the clusters (or "industrial districts") are concerned (especially when compared to the performance of the manufacturing enterprises as a whole)[37], we can assume that belonging to a cluster can lead to better sales results. This assumption made according to the average data hides some differences among the clusters analysed: for instance, Brianza (Italy) has suffered from a higher decrease of turnover in 1996, Jura (France) is passing though a phase of stability involving two-thirds of the enterprises.

A positive correlation between occupational trend and turnover performance can be found in the results of the survey: two out of three enterprises which have recorded a growth of the number of employees have, at the same time, had an increase in sales and about one-third of the enterprises which have reduced their personnel have seen their turnover decreased (graph 1).

[37] In Italy, Istituto G. Tagliacarne has developed since 1995 a survey on a sample of 300 SMEs located in the so-called "industrial districts" (some of which have been included in the case studies of the DELOS Project). The firms of the sample show in this case a slightly worse performance, in terms of turnover, compared to the results of the DELOS Project Baseline Survey.

Graph 1 - Occupational trend and related turnover performances



There is a wide evidence of the positive attitude of cluster enterprises towards investments, especially in the field of products. Improvement of existing products (54% of the total) and research of new products (46%) stand at the highest level, followed by investments in production processes (substitution of obsolete machinery, enlargement of the production capacity and introduction of new machinery, all of them carried out by 40% of the enterprises). The second highest percentage recorded refers to the training activities (52%), particularly felt as an important field of intervention by clusters characterised by a high technological level of the industrial structure (the Italian medical devise cluster of Mirandola and the TECs cluster in UK).

These results can be related to three main phenomena:

- clusters are widely open to different market outlets. If, on the one hand, 79% of the enterprises refer to the local market (and 47% of them consider it as the most relevant one), on the other hand three out of four enterprises get part of their turnover from export to Eu countries and two out of three from non -Eu countries;
- only one-third of the sample intends to develop strategies aimed at the maintenance of the market positions acquired in the past; this can be seen either as a result of past successes (as in the case of the Prato (I) and the TEC's (UK)) or as a consequence of difficulties they recently suffered from (Machine tool cluster in Spain or Jura in France);
- the main strategy followed seems to be the one referred to the product innovators, both for the same market (22%) and a new customer base (12%); this strategic attitude is prevalent in the two French clusters and in the Italian Mirandola, but seems to be less important in Spain and Austria; a more evident

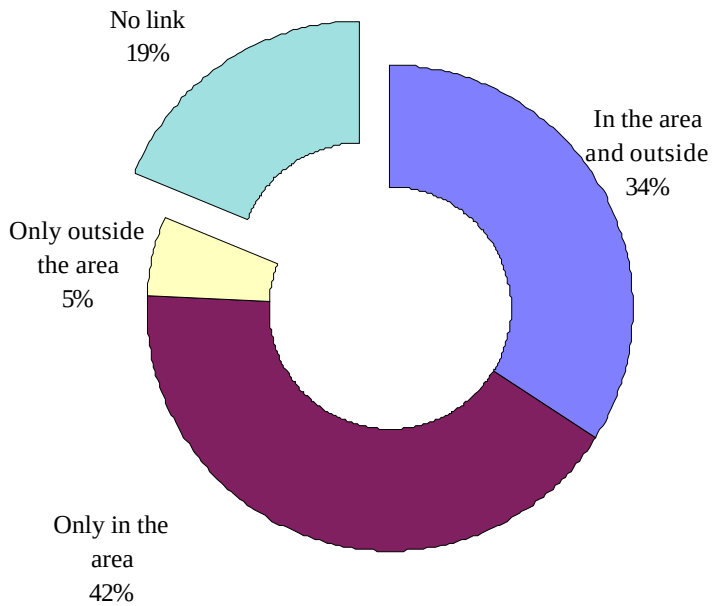
orientation towards product (and/or market) innovation can be found among the enterprises which produce after the order of standard products: the percentage connected to this group is ten points above the one referred to the firms whose production goes directly to customers (46% and 36%).

The clusters analysed are mostly structured inside as “networks”:

- 14% are part of a larger company, located in most cases in the same area;
- 14% have subsidiaries, in the area or outside;
- 81% have established formal links with other enterprises, mainly with enterprises located in the same area (graph 2).

The links with firms located in the same cluster are mainly based on the belonging to the same business association (64%) and/or Chamber of Commerce (60%). Apart from this kind of links, the results of the survey have shown a significant way of “networking” in the sub-contracting: 38% of the sample contract out jobs to other companies of the same area, 32% accept orders from other enterprises. After the links on the production side, particularly significant are the connections related to the commercial activities (20% for the joint promotion and sales programmes, 13% for the participation in commercial missions abroad), the training activities (23%) and, above all, the efforts towards the technological and innovative up-grading of the cluster as a whole. In fact, 22% of the firms take advantage from service centres located in the same area (and in some cases they participated directly in the creation of these centres) and 13% have carried out joint programmes of R&D.

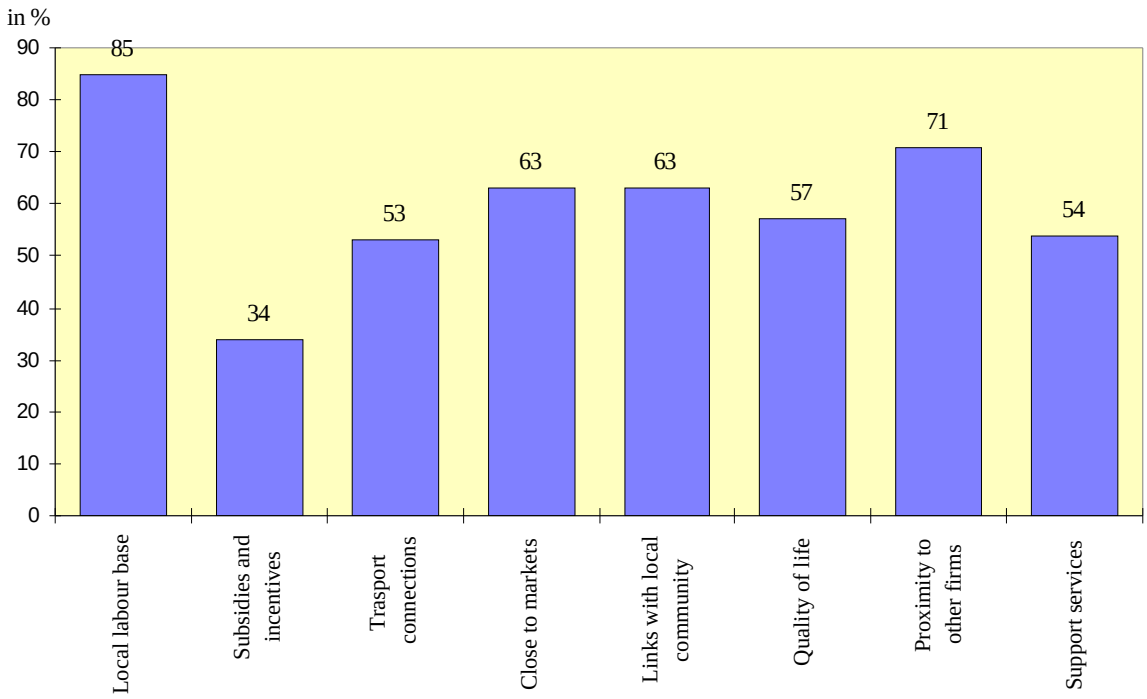
Graph 2 - Formal links with enterprises inside and outside the cluster



Generally speaking, the relationship with other companies of the cluster is mainly marked by collaboration rather than competitiveness: about one enterprise out of three feels the lack of collaboration (but this value grows in Austria, in both Spanish clusters and in Jura, France), but a little less than half of the sample finds some collaboration on matters of self-interest and 15% share goals and objectives with other firms (especially in TEC's cluster in UK and in the Reflex'oise cluster in France).

The advantages that the enterprises felt when deciding to locate or belong to the cluster are mainly related to the skilled personnel available (85%), particularly important if we consider that 87% of the firms have recruited the majority of employees in the same area (graph 3). Second best is the proximity to other firms (71%), that, from a socio-economic point of view, is followed by the links with the local community (63%). The support services (54%) seem to have followed the development of the cluster and not the other way round: they have played a limited role in the creation of the cluster and in attracting enterprises in it (with the exceptions of the machine tool in Spain and in both the English cases).

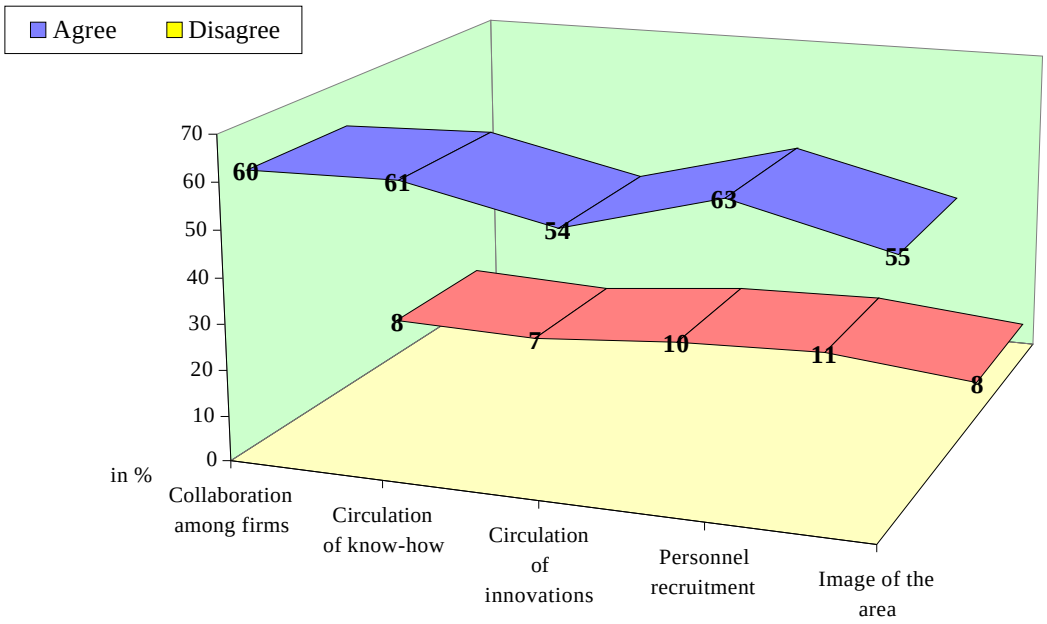
Graph 3 - Reasons to operate in the area of the cluster



Apart from the reasons having determined the choice to operate and/or belong to a cluster, the main advantages that the firms link to the cluster itself are the facilitation in recruiting skilled personnel and, strictly related to this, the circulation and diffusion of know-how (graph 4).

The greater possibility to develop collaboration and agreements among firms is also seen as a competitive advantage for the firms of a cluster, but the circulation of technological innovation is hardly experienced as a positive feature by half of the sample. On the lowest step there is the image of the cluster, which is felt in a stronger way by the subcontractors operating mainly on the local market, because of the so-called "reputation costs" they associate to being part of a cluster.

Graph 4 - Advantages of belonging to a cluster

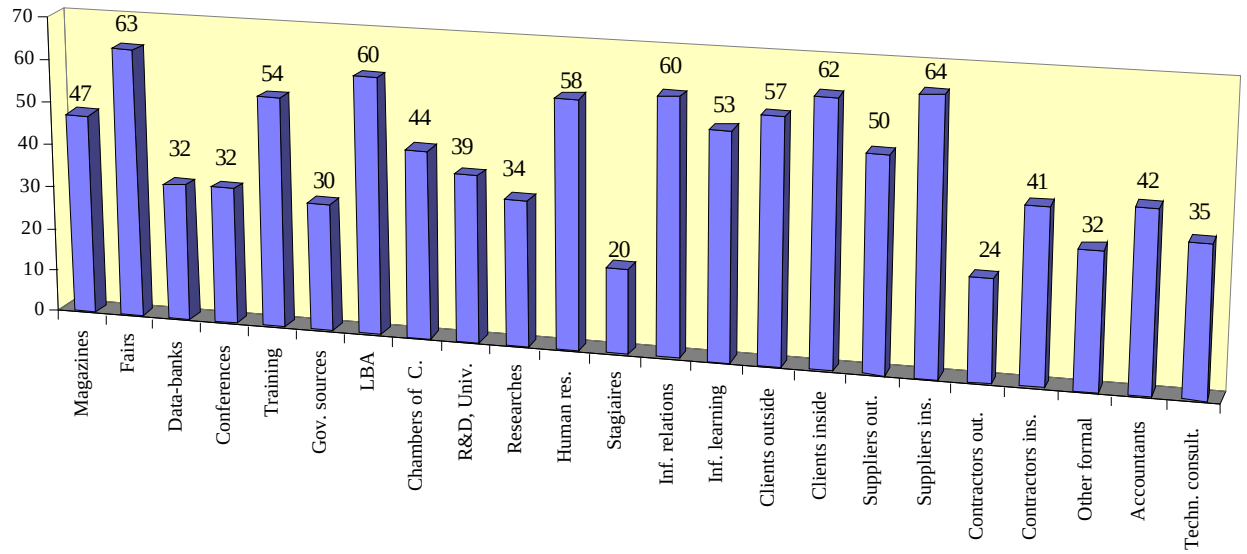


The socio-economic *milieu* (relationships with other firms and with the local community, availability of personnel, etc.) seems to be the main "pushing" factor to operate in the cluster. Nevertheless, the strengths of the firms appear not to be so directly related to these "environmental" features. If, on the one hand, some features related to the "core competencies" still prevail as strengths (management 85%, highly qualified personnel 82%), the firms feel, on the other hand, weaknesses as far as the level of innovation (17%) and the ratio quality/price (19%) are concerned. This may be due to the characteristics of the innovation acquisition process in these firms: in most cases it can be considered not as based mainly on R&D activities but on the acquisition of new technologies (both on product and process) and on "imitation" of what the other enterprises (especially the ones belonging to the same cluster) have been carrying out.

The milieu of the cluster plays an important role also as far as the information sources are concerned (graph 5): suppliers and clients belonging to the same cluster (64% and 62%), informal relations with other firms (60%), incorporation of specialised human resources (58%). Other important ways of transmission of knowledge are the Business Associations (60%), the training activities (54%), the informal learning through contacts with family members and/or friends (53%).

The "coldest" and less personalised information sources are nevertheless considered as rather significant: fairs (63%) and magazines (47%) can still be found among the most common ways to keep up-to-date with what is going on in the business sector. This is particularly true for all the Italian clusters, whereas English clusters seem to put a greater emphasis on the links with other enterprises (inside and outside the cluster itself).

Graph 5 - Importance of information sources (in % on total)

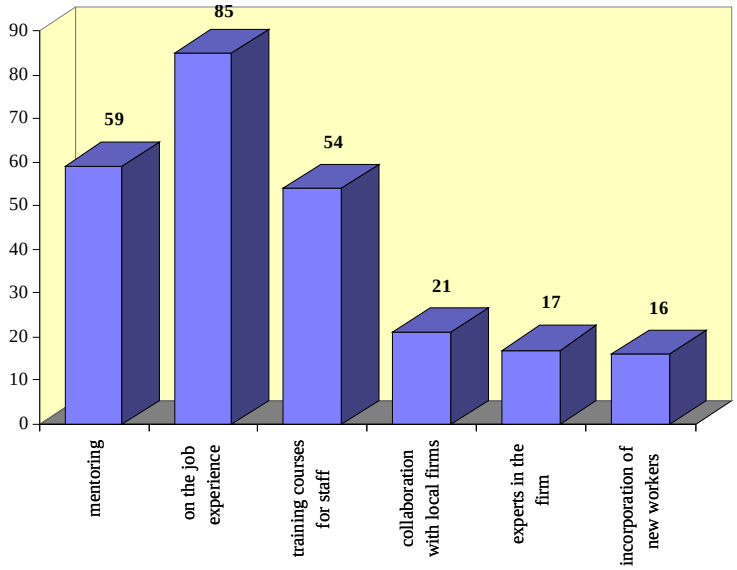


The informal relations, whose importance in learning processes inside the cluster is also stressed by the high average of firms involved in it (80%), are differently widespread according to the subjects participating in them: meetings at the Local Business Associations refers to 53% of the sample, followed by the social events in the community (31%) and between the entrepreneurs (32%). The use of informal ways to share goals and experiences is more common among the medium enterprises (50-249 employees) started up before 1960, particularly oriented towards the product innovation with or without the simultaneous research for new markets.

Learning by doing confirms to be the prevailing method of acquisition of know-how (graph 6): in fact, on-the-job experience is considered as the most relevant way of acquiring "technical" knowledge (85%) - especially for sub-contractors and export-oriented firms - followed by "mentoring" (i.e. the advice and help from an experienced person) with 59% and the training courses for staff (54%).

The best results in terms of improvement of know-how and competencies have been recorded by the enterprises which have temporarily introduced experts in the firm or have incorporated new workers.

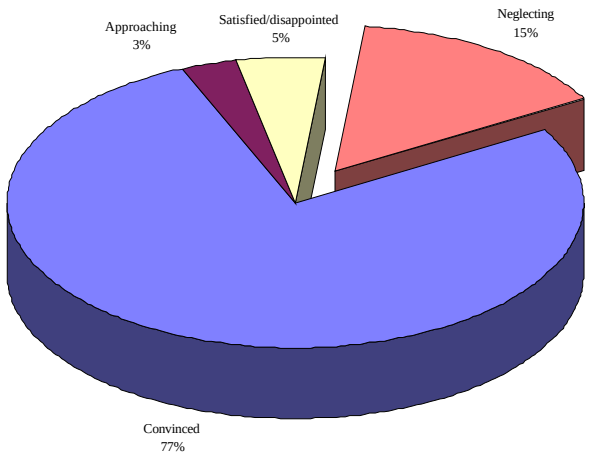
Graph 6 - Ways of acquisition of know-how and expertise



The know-how existing among staff and the firms' accumulated experience is transmitted in day-to-day business decisions frequently (35%) or always (15%) in informal way, i.e. through a communication system (mainly oral) which is implicitly understood by anyone who wants to use it. Formal rules and procedures are widespread in 38% of the sample and the participation in working committees is generally used by 31% of the enterprises, mostly the ones operating on national and international scale.

In spite of the growing importance of informal ways in acquisition and storage of know-how, training activities for staff still represent a cornerstone: three enterprises out of four have carried out investments in the last two years and intend to invest in training also in the future (graph 7). Mirandola, TEC's, the Asian family, the Spanish machine tool and automotive components clusters, Jura and Reflex'oise stand well above the average as far as past investments in training are concerned. Generally speaking, only 15% of the sample seem to neglect any kind of activity in this field.

Graph 7 - Attitude of enterprises towards staff training activities

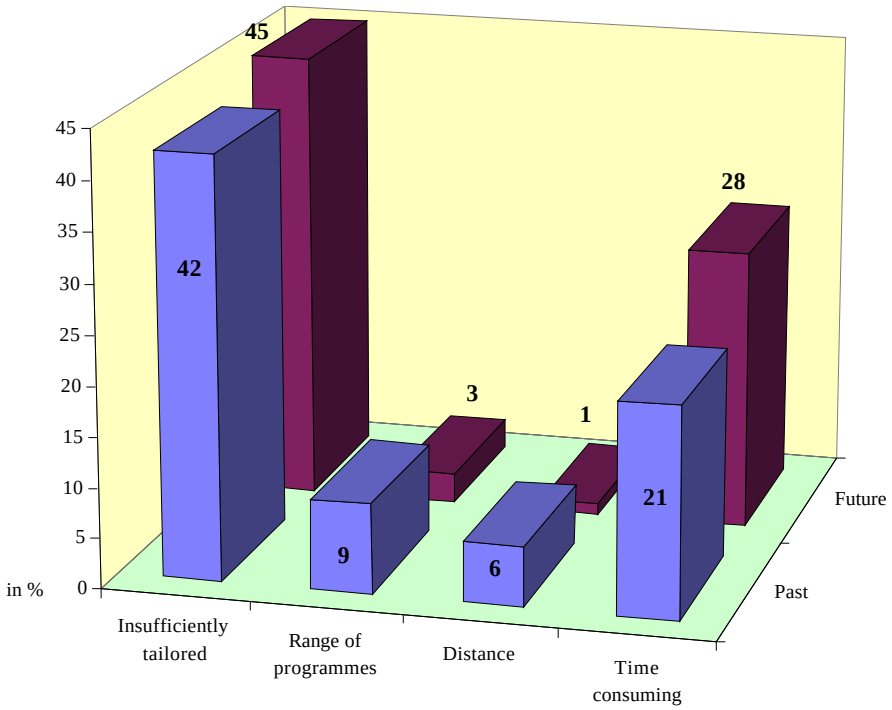


Training activities have direct effects on the strengths of the enterprise: 90% of the “training oriented” firms remark to have qualified personnel, while this percentage reduces up to 63% in the case of companies which do not intend to invest in training.

The problems related to the access to training are more connected to the quality of the offer rather than to the quantity (graph 8): the enterprises perceive these activities insufficiently tailored to their requirements or too time consuming, and these feelings seems to grow considering the future attitude. The quantity of supply does not seem to be an obstacle: the range of programmes and the proximity of training centres (both private and public) are considered as satisfactory by practically all the firms with no training orientation.

The companies which undertake training activities follow the aim of anticipating forthcoming changes (67%), of refreshing and updating (64%) and, above all, try to find solutions in order to adapt to changes (69%), such as compulsory regulations.

Graph 8 - Reasons for dissatisfaction at investments in training

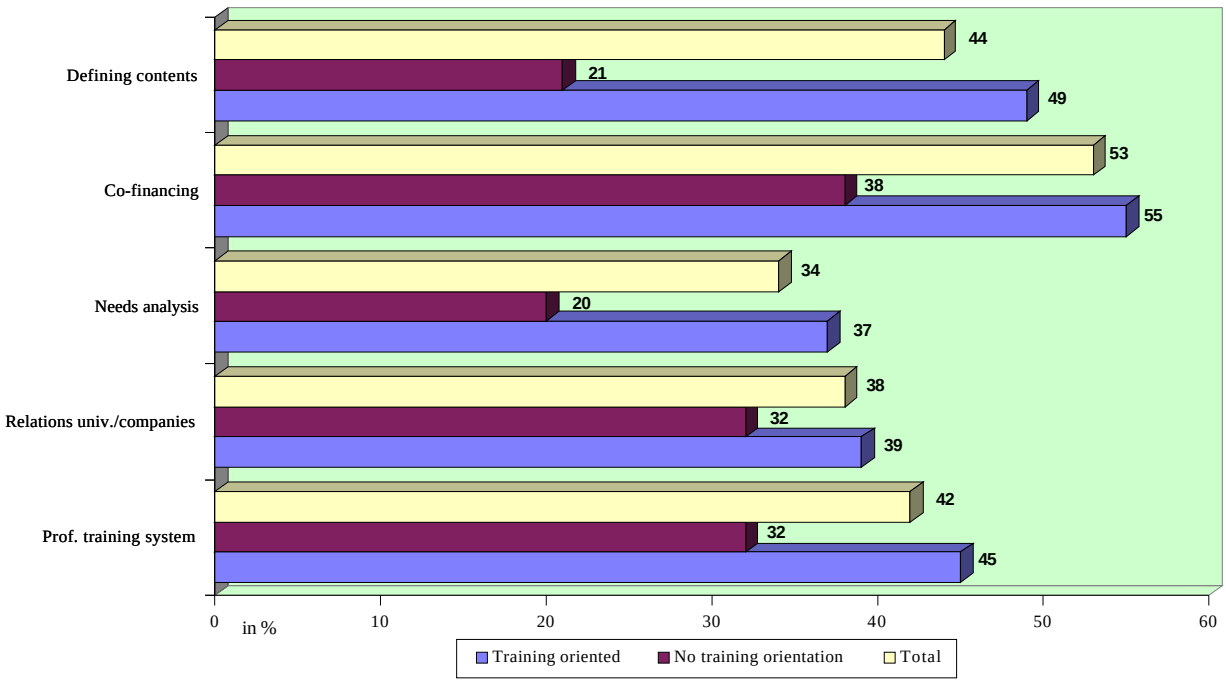


Both for the firms which have undertaken training activities and those which have not, these services should be aimed at developing first of all professional technical expertise (40%) and “soft skills” (35%), i.e. attitude to problem solving, negotiations, team work, etc. Training in itself is hardly conceived as a sole way to acquire competencies in order to develop innovative strategies, leaving room to more “personalised” services (consultancy, etc.) in addition.

The evaluation and constant monitoring of training needs is carried out mainly through informal exchanges with other firms or training institutions related to the cluster (37%). The formal monitoring of the needs can be referred to 30% of the enterprises, which develop needs analysis schemes directly inside the firm. Only 8% of the sample take advantage of external consultants in this evaluation. It is also important to stress that almost 15% of the "training oriented" companies do not carry out any needs analysis.

The lack of financial resources seems to be the main obstacle to the undertaking of training activities: 53% of the enterprises ask for public intervention in co-financing this kind of investment. Training oriented enterprises think that government (at local, regional, national or European scale) should support them in needs analysis (37%) and, above all, should involve them as much as possible in defining the contents of training programmes (49%) in order to make them more tailored to the real needs of the company. Entrepreneurs also feel some lacks in the professional training system (especially in Biella and in the Spanish automotive components cluster), whereas in some clusters (Brianza, Mirandola and the same Spanish sample) an improvement of the relations between universities/technical schools and companies have been recorded among the main field of intervention requested to the public system.

Graph 9 - Government support in training activities (% on total)



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Haveing selected the 12 cluster to be analised, at the national case study reporting started. Each **case study developed** its own methodology mix , including:

- ü exploratory questions, attempts to identify issues in a domain that is relatively little explored (e.g. is the cluster a useful construct that can be applied across different geographical boundaries?)
- ü descriptive questions, in order to elaborate on the domain already identified (e.g. what is the geographical and sector spread of SME clusters?)
- ü predictive questions (e.g. if we implement a particular regional training initiative, what are the likely effects on economic growth in cluster X?)
- ü explanatory questions (e.g. is the lack of training support organisations a significant factor in constraining organisational learning?)
- ü prescriptive questions (e.g. what support structure could facilitate the circulation of know – how between SME in a cluster)

In order to select the most appropriate methodology mix for each case study (which methods, techniques and instruments to be used and the content of the instruments to be used) a mapping exercise was conducted. The aim of the mapping exercise was **to place each cluster/network within its socio – economic context.**

On the basis of the outputs of the mapping exercises, partners responsible for each case were asked to produce:

- ü a set of key research questions and hypotheses addressed for each case, within the context of the overall research objectives for DELOS;
- ü a methodological design for each case, specifying units of analysis, methods, techniques and tools;
- ü an implementation plan outlining the operational aspects of the field work.

To carry out this task, the Consortium needed :

- ü to establish the appropriate spatial boundaries within which 'locate' the cluster
- ü to identify the key economic, political, cultural and social arrangements (including their historical dimension) and describe how they affect local economic activity within the cluster/network
- ü to map the character, size and shape of the firms within the cluster; the 'density' of support institutions and level of interaction amongst them.

Therefore, the mapping exercise involved the following components:

- a ***socio-economic profile*** of the cluster, to broaden understanding on the social and historical context in which the cluster has developed and currently operates; the profile was structured in order to answer the following research questions:

Level	*Economic context*	*Socio-Cultural context*
Macro	v What are the general strategic national conditions (socio-economic, techno-economic, political institutional) within which clusters/networks are located? v Are there particular economic, industrial, science and technology policies and infrastructure that promote and support the cluster/network? v What sectoral based policies for economic support are in place and how do these relate to the local/regional dimension?	v What are some of the ways in which global cultural flows (cultural homogenisation) intersect with national/regional cultural processes and identities?
Regional	v Is there an historic economic base to the region? How has this evolved over time and in what ways has it shaped the economic activities of clusters and networks? v How has any economic restructuring at regional level impacted on the stability of networks?	v Do the political authority and governance structures shape the form of cluster/network activity? v What is the 'social atmosphere' in the region (sense of 'community' or self-identification with a region)? v What are the normative elements of the region (eg strongly developed common value systems which clearly define and sanction acceptable/non-acceptable forms of economic behaviour)?
Local	v In what ways are the economic activities of the cluster/network linked with wider regional/national/global economies? v How much stability is there in the local business environment? v What is the labour market profile and nature of labour mobility in the local economic area/cluster?	v How homogeneous are the network members (extent to which they share the same backgrounds eg class, gender, familial ties, religion, institutional ties, political outlooks, etc.)? v Is there a shared cultural identity? v Is there a normative commitment to act in particular ways eg. to follow a particular industrial policy agenda?

ü an ***environmental audit***, intended to identify the operational parameters and constraints under which field work was carried out; the relevant research questions for this section were:

Cluster	*Focus*	*Questions*
	Nature of cluster	v What is the size and composition of firms in the cluster/network?
	Economic activity	v What is the basis for their industrial competitiveness (knowledge, information, innovation etc.)? v What are the likely trends in the evolution of technology, markets and competition in the sector(s) within the cluster/network? v What is the dominant 'industrial competitiveness' paradigm (or strategy) of the cluster/network? v What is the market shape (nature of customers/suppliers; relations with customers, etc.) of the cluster/network? v To what extent are the various parties (firms, customers, suppliers and competitors) involved in the same transactional network?
	Institutional infrastructure	v What actors and agencies, promoting or supporting the socio-economic activities of the cluster/network, exist within the 'case'? v v What is the nature and level of interaction among the different kinds of institutions, including the firms, that comprise the 'case'? v What mechanisms are there for collective representation? v What mechanisms are there for the creation of socially-shared beliefs which guide strategic choices?
	Organisational structure	v How is the network/cluster organised? *-how loosely/tightly bounded ?* *-is there a cluster management?* *-is there a formal structure?* *-how do actors in the cluster/network communicate?* *-what is the main vehicle of communication and exchange?* v Is there a mutual awareness that the firms or enterprises are involved in a common enterprise?

ü a ***learning infrastructure framework***, designed to identify what information sources and communication mechanisms are used within the cluster; the research questions for this section were:

		Processes	*Mechanisms*	*Support Actions*	*Actors*
v	***Intra-organisational***	v TQM v systematic problem solving v continuous improvement v acquiring external knowledge (eg market intelligence)	v steering ctte for quality process v action learning/quality circles v team working and problem solving teams v customer and supplier feedback mechanisms v benchmarking	v learning strategy for org v IT systems for info exchange and feedback v self-development opportunities and reward systems	v individuals v teams v mentors/coaches
v	***Inter-enterprise***	v transferring and exchanging knowledge	v site visits v short job secondments v labour mobility within cluster v benchmarking v collaborative action learning on emerging socio-technical practices v network meetings v training events v less focused exchange sessions v informal exchange	v newsletters, reports. oral presentations v compilation and dissemination of 'best practice' case studies v labour market profiles and data bases v IT systems to support inter-enterprise communication and coordination v fora for the collective interpretation of information	v boundary spanners v professional and technical institutes v action learning catalysts v advisory and facilitating agencies v professional associations v cluster assoc. management v technology transfer institutions

(continued)

Learning infrastructure framework (continued)

	Processes	***Mechanisms***	***Support Actions***	***Actors***
Inter-enterprise	∨ acquiring external knowledge ∨ generating new knowledge	∨ joint research and intelligence gathering (on markets, relevant technologies and trends) ∨ joint production ∨ co-operative research ∨ collaborative action learning	∨ technology management and business strategy ∨ matching technology and organisational systems ∨ shared longer term orientation towards technological environment	∨ trade/industry and professional associations ∨ Chambers of Commerce ∨ consultants in marketing ∨ suppliers/customers/competitors ∨ agencies supporting organisational R&D ∨ specialised university research centres ∨ RTD departments in companies

Finally a **template**, that is the common index to be used for the case study reporting - a standardised 'case study summary' *pro forma* was elaborated. The template summarises and links:

i. the common research questions;

ii. the items to be explored.

The case studies allow for the exploration and testing of conceptual constructs as well as the analysis of data derived from observing, documenting and decoding the behaviours of actors.

The template was structured as follows:

Section A) ***THE CONTEXT*** that is the cluster socio-economic context and knowledge framework

a.1 the socio economic context , whose objectives were:

- ü analyse and describe the territoriality dimension and the industrial milieu in which the SME and cluster are located
- ü identify the role of the SME and cluster in regional development
- ü positioning of SME and cluster within macro-economic structure & process
- ü map (positioning) the SME and cluster as embedded in socio-economic networks and socio-cultural environment
- ü describe the organisational structure of the SME and cluster
- ü describe and evaluate the institutional thickness of the Cluster
- ü identify the key factors for the cluster competitiveness

a.2 the knowledge framework

Starting from the awareness that in a cluster firms are embedded in a socio-cultural environment with the values and culture of communities, the aim of this section was :

- to identify and describe the knowledge base of the cluster, together with the knowledge infrastructure and the learning "agents" operating there;
- to identify and describe the diffusion mechanisms through which knowledge and know-how are spread.

Section B) PROCESS AND ACTIONS which was referred to the way learning processes can be analysed and checked both at inter and intra organisational level and at the effects of learning ; the objective were:

- to define the ways in which clusters and their components interact;
- to analyse how knowledge and learning are used;
- to underline the effects of the learning processes and knowledge diffusion both at firm and at cluster level.

b.1 learning processes

As the Consortium needed to convert all the case study outputs according to common parameters, it was necessary to categorise and simplify the learning processes taking place into the cluster. To this extent , it was proposed to assume that learning processes are based on an idea of organisational learning as a complex phenomenon which can be articulated in 4 main process:

a. ***learning by doing and experience:*** that is the way firms accumulate a relevant know-how over time, learn by doing and innovate their routine (technological, managerial, organisational...) and the other actors of the cluster support the firms to develop this learning process.

Key concept: routine.

Routines are what is more typical of an organisation, what makes it different from any other, and what allows for its evolution by following the existing path (on one hand, routines are formal artifacts - rules, procedures, conventions - on the other hand, they are something deeply related to cognitive and cultural phenomena - beliefs, frameworks, paradigms). Routines embody both the codified knowledge and the implicit knowledge and they store the memory of an organisation. In the learning organisation, there is an intensive selection among the routines in maintaining and recombining those which work

Focus on:

i) the learning ability of the firms to transfer their experience into new and formally established routines;

ii) the ability of the cluster to foster learning from the common application of know-how.

b. ***knowledge sharing***: that is the ways firms consciously organise their internal knowledge flow (communications systems, interfunctional working groups etc...) and the other actors of the cluster actively support the firms in order to develop their communication flows (reciprocal information, networks, institutionalisation of informal links, etc...).

Key concept : knowledge as a social construction

Knowledge in the organisation is largely of a collective nature. The knowledge is built through cognitive interaction between the actors of a given organisation; the ways in which people co-operate, apply and modify the routines, understand the day-to-day reality, record the most important events in the organisational history.

Focus on:

i) main characteristics of the firms as can been seen from the development of their socio - cultural reality. Positive learning dynamics at this level can be improved through open communication and organisation system allowing "double loop learning" style behaviour and interaction;

ii) the capacity of the cluster to develop mutual learning among its members

c. ***acquiring relevant external knowledge***: that is the way firms scan their environments and acquire knowledge relevant for their own development (from clients and suppliers, by imitating, by co-operating, etc..) and the other actors of the cluster actively support the firms for the acquisition of relevant knowledge from different sources (patents, marketing, R&D, organisational consulting, etc...)

Key concept: reduce the boundaries with the external environments

At this level the difference between formal and implied knowledge is relevant: at the first level knowledge is an economic asset which firms can buy on the specific knowledge markets (patents, licences etc.); the firm can also create knowledge through its R&D departments or through inter-firm co-operation.

Focus on:

i) the learning capacity of the firm related to the conscious exploitation of every available source of knowledge;

ii) the capacity of the cluster to acquire new knowledge which is useful for its members

d. ***developing knowledge and competencies***: that is the way firms are able to systematically identify, reward and train the competencies they need and the other actors actively support the firms for a rational development of competencies at a local level (common training programmes, placement, etc..)

Key concept: from an adaptive kind of learning to a generative one

The ways in which firms and cluster are able to produce, increase and manage knowledge through the continuous use of the learning processes

Focus on:

i) the learning capacity of the firms related to the use of knowledge embedded in people;

ii) the capacity of the cluster to promote the competencies acquisition and development.

b.2 the effects of the learning processes, in order to:

- analyse and describe the effects of the learning processes induced both at firm and cluster level

Section C) THE OUTCOMES , that is the cluster SWOT analysis and conclusions and recommendations, whose general objectives were :

- ü allow the integration of the cluster characteristics and learning processes
- ü identify and rank the intervention policies supporting the cluster

c.1 SWOT analysis

with the objective of :

- ü identify and describe the strengths and weaknesses point referred to the cluster as a learning organisation

c .2 conclusions

with the objectives of :

- ü verify the starting hypothesis of the DELOS project and evaluate the cluster orientation toward knowledge acquisition and learning;
- ü evaluate the effectiveness of the cluster acting as learning organisation pointing out best practices and supporting policies.

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A short 'identity card' of each of the cluster analysed is presented below:

Cluster IT1: BRIANZA

- Ø sector: wood - furniture - furnishings
- Ø location: 46 municipalities between the provinces of Milan, Como and Lecco (Lombardy)
- Ø typology: spontaneous - marshallian district.. The Brianza cluster involves an area between the provinces of Milan, Como and Lecco. The firms are mainly small craft ones but there is also a relevant number of medium-sized companies which are "leaders" at national and European level. The cluster comprises of a large number of institutions, organisations, service centres supporting local SMEs. An "ad hoc" district committee has been recently set up. The "cultural identity" of the area is strong and widespread and the organisational learning process seems to act on a "tacit" level mainly through learning by doing and experience & knowledge sharing **.**
- Ø methodology chosen for field work: baseline survey, face to face interviews, focus groups.
- Ø Partner responsible for case study: Istituto G. Tagliacarne (IT)

Cluster IT2 : BIELLA

- Ø sector: textile
- Ø location: 83 municipalities in the new province of Biella (Piedmont Region)
- Ø typology: spontaneous - marshallian district. The Biella cluster - located in Piedmont, a north-west region - involves an area of 83 municipalities, with 190.000 inhabitants, its territory is spread over 930 square km. The cluster is focused on textile sector. The firms are mainly small craft ones but there is also a number of medium-sized companies which are "leaders" at national and European level. The cluster in 40 - 50 years has gone from a closely vertically integrated system to forms of flexible horizontal type of integration.The cluster comprises of a large number of institutions, organisations, service centres supporting local SMEs. The "cultural identity" of the area is strong and widespread and the organisational learning process seems to act on a "tacit" level mainly through learning by doing and experience & knowledge sharing. The Biellese is an area of old industrial traditions- as early as the 17th century an adroit class of entrepreneurs laid the foundation of the fortunate business associated with cotton and wool industry .
- Ø methodology chosen for field work: baseline survey, face to face interviews, focus groups.
- Ø Partner responsible for case study: Istituto G. Tagliacarne (IT)

Cluster IT3 : MIRANDOLA

- Ø sector: bio-medical
- Ø location: about 10 municipalities around the town of Mirandola (Emilia Romagna Region)
- Ø typology: The case refers to the industrial milieu of Mirandola and surrounding area (Emilia Romagna Region) which is characterised by a well defined and specialised device/bio-medical sector placing the area at the second place in the world for concentration of companies and production.The industrial history of the cluster is connected to the history of a single entrepreneur who was the first to introduce the disposable medical idea in Italy in the 60s. Since then, this entrepreneur started a number of specialised medium companies which have been later on acquired by big multinationals. Further, over the years, a number of spin-offs took place. Nowadays the industrial milieu is composed by around 100 companies for a total of 2,300 employees. The composition and features of firms comprises: (a) multinational companies, (b) local independent companies, (c) a group of original equipment manufacturers, and (d) a large number of very small assembly companies. Recently an interesting sub-cluster appears consisting of a Consortium of companies working together on a well defined common-project. Besides that some training and service centres support the cluster
- Ø methodology chosen for field work: baseline survey, face to face interviews, focus groups
- Ø Partner responsible for case study: Istituto G. Tagliacarne (IT)

Cluster IT4 : PRATO

- Ø sector: textile
- Ø location: Prato province (Tuscany Region)
- Ø typology: The Prato textile cluster covers an area of about 700 sq km with a population of about 300.000. The cluster of Prato presents the typical characteristics of the marshallian district. The territorial production system includes a large number of independent enterprises of small size, these enterprises carry out one or few phases of the whole production cycle, which implies a high degree of technical specialisation of human and technological resources. The enterprises have a semi-integrated structure, in the pattern of a network organisation combining effectively quantitative factors, flexibility, control of timing, production quality and costs, to achieve enhanced competitiveness. The production structure is territorially and industrially concentrated and favours economy of scale at system level, which are typical of big enterprises. The industrial district of Prato constitutes an integrated system in which the form of social and economic co-operation produce competitive advantages of flexibility and global economy of scale.
- Ø methodology chosen for field work: baseline survey, face to face interviews.
- Ø Partner responsible for case study: Formit (IT)

Cluster UK1 : ASIAN FAMILY

- Ø sector: newsagent
- Ø location: across Great Britain
- Ø typology: The 'Asian Family Network' (AFN) is a vertically integrated, hierarchical closed cluster which currently comprises 19 SMEs - all engaged in newsagent distribution activity - centred upon the patriarchal authority of the head of an Asian family resident in Great Britain . The component SMEs are vertically integrated in a well established and strictly enforced hierarchical order, determined by a complex web of business and personal link. The AFN cluster is a relatively closed business system and membership is limited to the original members of an immigrant Asian family and their male descendants. Each of the 19 SMEs is legally owned and managed by the oldest male representative of the respective family.
- Ø methodology chosen for field work: baseline survey, in depth face to face interviews.
- Ø Partner responsible for case study: The Tavistock Institute (GB)

Cluster UK2 : AUTOMOTIVE FIRM/TEC

- Ø sector: multi sectors
- Ø location: East Midlands
- Ø typology: The Automotive Firm cluster has been defined as a vertically integrated, non-hierarchical, closed network, which currently comprises a large number of SMEs, the membership of which is strictly controlled by a central purchasing organisation. The links between the PO and the SMEs include purchase-related activities, technical and IT exchanges, training activities and co-operation in the area of R&D. Considerable economies of scale have been achieved from inter-cluster activities. However there is another cluster, a learning one, at play : it is based on these SMEs membership of 10 different TECs within the region. This further cluster can be defined as: centrally integrated, agency based, non-hierarchical, open network The two-related cluster are placed in the West Midlands.
- Ø methodology chosen for field work: baseline survey, face to face interviews.
- Ø Partner responsible for case study: The Tavistock Institute (GB)

Cluster ES1: MACHINE TOOL

- Ø sector: machine tool
- Ø location: Basque Countries
- Ø typology: The cluster refers to a well identified industrial milieu specialised in the machine tool industry placed within the Basque Country .The industrial milieu involves 134 enterprises (16 with more than 100 employees) for a total number of 6.071 employees. The enterprises in the cluster are integrated around five main groups that imply half the sectoral employment. R&D activities are mainly carried out by the research centres that contribute to mitigate the poor technological situation of the enterprises of the cluster. The machine-tool sector has suffered during the last years important changes due to the forthcoming technologies and new materials In 1994 the Office of Strategic Investment where the Basque Government and the Regional Government participate, decided to include in its program of Strategical Alliances, the cluster of machine-tool. The main fields of work where the basque machine-tool cluster is working are the following: collaborations and enterprise mergers, centralized administration of purchases, co-ordinated training programs, development and dissemination of auditing and quality programs, commercial advice, market analysis, and the development of a local infrastructure
- Ø methodology chosen for field work: baseline survey, interviews, focus groups, workshops
- Ø Partner responsible for case study: Infyde (E)

Cluster ES2 : AUTOMOBILE COMPONENTS

- Ø sector: automobile auxiliary industry
- Ø location: Basque Countries
- Ø typology: The case refers to a well defined industrial milieu specialised in the automotive component sector placed in the province of Bizkaia in the Basque Countries. The cluster includes different productive activities: foundry, melting, tooling, mechanising, assembly, plastic injection and rubber treatment . In 1991 the cluster was formed by 156 enterprises including in this classification enterprises with more than 20% of their sales aimed at the automobile sector. The auxiliary automobile industry in the Basque Country has historically very open to the participation of foreign investment. Since 1992 the Basque Government has being trying to promote an integrated approach supporting the regional clusters and among these the automotive cluster. Its main tool is the setting up of thematic working groups. These groups are participated by representatives from firms and their association, technological centres and Universities, expert and consultants. Besides that, the Association of the Cluster of Industries and Automobile Components (ACICAE) was established in 1991 for the revitalisation of the sector and the improvement of its competitiveness, but it is scarcely representative of local SMEs. A Basque Country Technological Centres Network (EITE) operates for the cluster
- Ø methodology chosen for field work: baseline survey, interviews, focus groups, workshops
- Ø Partner responsible for case study: Infyde (E)

Cluster FR1 : ASSOCIATION OF FRENCH TOYS

- Ø sector: toys
- Ø location: Jura Region
- Ø typology: The case refers to a well identified industrial milieu specialised in the production of toys where, under the pressure of growing competitiveness an Association was created in 1986 grouping 28 toy manufacturers (who, together, produce more than 60 % of toys on the French market) and representatives of state, regional and local bodies. It is open to all toy manufacturers in France and in Europe. The present companies, of different sizes, manufacture a wide range of toy products using wooden, plastic, metal and other types of material. In 1989, the association created the 'Maison du jouet', one of the pivots for its activities. The main aims of the Association can be summarised as follows: develop procedures favouring quality standards, elaborate collective marketing strategies, develop collective actions aimed at specific export markets, develop and enhance the reputation of the area and its toy industry . The association is located in Moirans-en-Montagne in the heart of the Jura area, a department in the east of France. This area, well-known for its deep interest in preserving traditions can equally boast of its achievements in scientific, technological and cultural innovations. It is particularly devoted to motivating and encouraging the economic interests of SME, which, in the case of the toy industry, export on a world-wide level.
- Ø methodology chosen for field work: baseline survey, workshop, interviews, participation at key events.
- Ø Partner responsible for case study: CCI Paris / DFC (F)

Cluster FR2 : REFLEX'OISE

- Ø sector: multi sectoral
- Ø location: Oise (Picardie Region)
- Ø typology: Reflex'Oise is a partnership of professional organisations representative of the economic, industrial and commercial interest of the Oise department. This department is situated in the Region of Picardie (north of France).Reflex'Oise is a long term project centred around the construction of an "intelligent" network whose main aim is to contribute to the economic development of the department. Refle'Oise was created in 1993 under the auspices of the Oise CCI but encountered organisational difficulties in the launching phase. The project was shelved until the beginning of 1996 when it was re-activated with sufficient time and money allocated to ensure concrete realisations on the ground..
- Ø methodology chosen for field work: baseline survey, workshop, interviews, participation at key events.
- Ø Partner responsible for case study: CCI Paris/ DFC (F)

Cluster AT1: MATERIALS AND METALS

- Ø sector: materials and metals
- Ø location: Styria
- Ø typology: The cluster refers to a well-defined industrial milieu placed in Upper Styria characterised by a centuries-old industrial tradition based on rich deposits of iron-ore and coal. It has been dominated by nationalised industry, guaranteeing a stable employment situation till 1986. Decreasing competitiveness led to far-reaching structural changes like the subdivision into companies and a shift towards concentration on manufacturing. In 1986 22,700 people were employed in 19 companies, in 1994 the number of employees was only 9,350, in 38 companies. Still large companies in iron and steel industries are dominating the scene. As low-tech production is facing severe competition, an upgrading of the cluster is essential. That´s why technology transfer between manufacturing companies and research institutions is so important. On the one hand there are old-established research institutions but on the other hand the foundation dynamics in this field are remarkable. Recently various technology centres as well as industrial parks have emerged..
- Ø methodology chosen for field work: baseline survey, interviews, database analysis, focus groups, workshops
- Ø Partner responsible for case study: InTeReg (AT)

Cluster NL1 : PLATO

- Ø sector: multi-sectors
- Ø location: Brabant province
- Ø typology: Plato is a concept that is based on pooling expertise of and for SME-managers, combined with a 'mentorship' model. The concept is based on the assumption that a lot of knowledge and experience is already available among SME managers. During previously determined period counsellor-managers from large enterprises are linked to fixed groups of 10 and 12 managers of SMEs. Each group regularly meets to mutually exchanges experience and knowledge. The Plato groups are linked by various network activities. The basic aim of the Plato concept is to support SMEs in their evolution and their professionalisation, providing a formal structure for building a network of SMEs. The cluster is based on the network Plato South - East Brabant ; this network is part of the international Plato network.
- Ø methodology chosen for field work: desk, interviews with Plato management
- Ø Partner responsible for case study: ECWS (NL)

The Asian Family cluster (UK1) was chosen in order to enrich the DELOS field work with a case study which, due to its peculiar history, the ethnographic implications and its mission, differentiate it from DELOS cluster concept.

A wide range of contacts have been during the case study reporting:

- the local Chamber of Commerce
- the local Business Association
- the main Training Institutes (and especially with the technical ones)
- the local University

- if any, the main local Knowledge Infrastructure (e.g R&D centres)
- several representatives of the leading firms
- the main service centres (both sectoral and non - sectoral)
- the local Authorities (e.g. the City Hall and the Mayor, the Province Authority etc.)
- any other subject who could play an part important in the cluster

All these actors were considered as part of the cluster: that means that the cluster was considered as a whole, as a result of different interactions which altogether allow the cluster to maintain its competitiveness and to develop.

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Therefore the **comparative reporting activity** was implemented, in order to provide a cross analysis reading identifying the key- comparable results .

As the *baseline survey* was designed to facilitate the building of a common basis through which each case study could have been analysed in comparative terms, it was decided that a supplementary baseline data analysis has to be set up before the drawing up of the comparative report. In order to so the data were processed through a **cluster and multivariate analysis**. The methodologies applied for doing that were: first , setting up of aggregate variables and secondly , multivariate tools, such as (i) correlation, (ii) variance and (iii) regression.

The data produced through DELOS field work have been processed and analysed in two steps:

1. aggregate variables (both for each cluster and for the "cluster of clusters") have been set up, focusing basically on:

- development trend in the clusters;
- organisational features of the clusters;
- learning processes;

2. multivariate analysis of the data derived from Baseline Survey, aiming at contributing to analytical and synthesising work involving, for example, interpretative analysis of the case studies and the comparative analysis of the descriptive baseline data carried out according to what above stated.

The analyses carried out can contribute to addressing the over-arching hypotheses of DELOS in the following ways:

- that SMEs commonly exhibit 'clusters' of structured patterns of interaction

  There is some evidence to support this position. The cluster analysis of the baseline data identified a significant degree of differentiation in SMEs behaviour on the basis of factors such as emdededness in the local milieu, and in relation to learning strategies. This does support the notion of a 'localisation effect' in relation to organisational learning. However, the analysis also identified

marked variations in the operational behaviours of SMEs, according to the different areas in which they are located;

- that SMEs collectively show aggregated 'organisational learning'

  There is evidence that SMEs adopt strategic knowledge gathering, know-how storage and dissemination and learning, though the relative balance of these dimensions, and the strategies, both informal and formal used, are complex. Firms appear to be strongly characterised by informal learning and, as far as the formal learning processes are concerned, there is clear evidence of a more widespread attitude towards in-firm training strategies. It is also true that organisational learning behaviours are mediated through factors such as embededness in the locale; size, age and purchasing power of the firm, and entrepreneurship factors, as well as other such as linkages with outside agencies;

- that such learning is related to 'success' and economic performance

  The analysis does support a connection between learning strategies and economic performance. In detail, it would appear that informal methods are more likely to promote growth than using outside training agencies, particularly in relation to the use of mentoring and on-the-job training.

Finally the **comparative report** included : (i) cross statistical elaboration of the baseline survey results; (ii) an overview of the case study results; (iii) a cluster taxonomy combined with policy options.

The case studies results overview was presented with the support of **summary sheets ,** each comprising of :

i. *executive summary and cluster profile*
ii. *sheet 1: the economic structure*
iii. *sheet 2 : organisational, socio- institutional and cultural profile*
iv. *sheet 3 : knowledge framework*
v. *sheet 4 : learning processes*
vi. *sheet 5 : overall comments and considerations*

The cross – reading of the summary sheets led to the following comments:

THE ECONOMIC STRUCTURE

Ö The **sectors** which the case studies are referred to are at present in a **maturity phase** and deeply involved in **globalisation trends**

Ö The industrial environment is **dominated by SMEs**, family business - even if still widespread – shows a decline

Ö As far as the firm behaviour is concerned, **company "leaders"** are well identified

Ö Identifiable **productive links** between companies are also present: these close grid of interactions make the clusters able to develop fundamental learning processes and shape their co-operation

attitudes

- **Innovation** - which is widely diffused - is mostly an **incremental** one (so a lack of R&D based innovation has to be underlined) and came from the firm itself : by means of day-to-day trial and error attempts , productive process imitation and variations and product adaptations.
- Both productive links and incremental innovation can sometimes facilitate **sub clusters** development
- **Local/regional industrial policies** are often addressed to support the cluster

ORGANISATIONAL, SOCIO-INSTITUTIONAL AND CULTURAL PROFILE

- Clusters can rely on a number of **supporting organisations**. A major supportive role is played by: i) leader companies ii) Local Public Authorities ; iii) Professional Associations and iv) Training Organisations. Significantly, the lowest score is performed by R&D organisations
- In several clusters a **formal management structure** operates, aimed at - mostly - i) improve the external image of the cluster and ii) to strengthen the identity of the cluster; these orientations can both strengthen:
  - the global dimension, making the cluster more attuned to face external competition
  - the local dimension, making the cluster able to preserve its own historical - cultural background and distinguishing features (productive, technical etc)
- A **wide range of services** - among which the most important are information, training and R&D - are addressed to firms operating in the cluster. It is important to mention, however, that - owing to the fact that innovation is scarcely R&D based - the latter services are not effectively exploited by the firm. On one hand, firms are often unaware of the benefits of R&D services because of the lack of information, of cultural prejudices and on the other hand R&D structures do little to reduce the gap between them and firms and do not have the ability to became a real partner of the firm.

KNOWLEDGE FRAMEWORK

- Human Resources in the firms perfom a set of core competencies strongly identifiable with **technical (production) skills**
- The context in which HR operate is absolutely **entrepreneurial style driven** , according to the prevalent cluster's SME composition
- **Leader companies** in the cluster act as **learning agents**: spreading information, knowledge and innovative behaviour models
- Besides them, a leading role as learning agents also belongs to the **education/ training system**; local trade, industry and professional associations are as important

- Ö With few exceptions, **training** is often organised according to an **"in - firm"** approach and to an **informal knowledge fostering** (through sub – supply chain and general meetings)
- Ö While the training and education system plays a fundamental role for the company belonging to the cluster, University and R&D system do not. Again, higher education and research structures - even if widely present on the ground - are often a "world apart"

LEARNING PROCESSES

- Ö Firms accumulate their know-how almost exclusively **learning by doing** (LDE) and **sharing their knowledge** (KS)
- Ö At intra-organisational level, poor performances result considering the ability of the firm to develop knowledge and competencies (DKC)
- Ö At inter-organisational level, the recourse to the **acquisition of relevant external knowledge** (AREK) is the most important strategy adopted: clusters are accustomed to scan the environment , to look at best practices , to act as network
- Ö Relevant **effects** of the learning processes act both at:
    - ◊ Intra- organisational level: **competitiveness** improvement, through network attitudes increase and **human resources** development **,** through core competencies constant improvement
    - ◊ Inter-organisational level: **cluster actors** strengthening , through network attitudes increase and improved ability in fostering outside information and opportunities

OVERALL RESULTS AND CONSIDERATIONS

- Ö It can generally states that:
    - ◊ clusters benefit of "ad hoc" regional /industrial policies as the local dimension is properly taken into account by regional /national authorities
    - ◊ the industrial mileu in which firms operate is strongly characterised by the presence of a number of institutional and professional actors; they play an outstanding role as learning facilitators
    - ◊ co-operation and networking attitudes make the clusters open to the external influences and facilitate the access to strategic info
    - ◊ informal communication channels make the exchange more direct, effective and fast

- ◊ common language and background strengthen the sense of belonging and the identity of the clusters

Ö If maintain a 'small' size certainly is a remarkable asset, stay "alone" is dangerous for firms as the sectoral trends (the globalisation phenomena above all) are no more evitable and face them effectively compel more network activities and more joint projects with other small businesses

Through the base-line survey a series of common findings have been identified. These findings which mostly refer to: i) embededness of an SME within the surrounding locale or cluster; ii) subjectely determined assessment of firm's strengths ; iii) information-gathering style ; iv) learning strategy of firms; v) strategy associated with the retention of expertise and with the up-grading skill and competencies represent the so-called "basic-common bricks".

In order to identify the distinguishing features for grouping clusters, a morphological approach was preferred. In other words, the morphological and organisational features were considered as the basis for the "grouping" exercise. So doing, we considered the learning process as being strictly functional to the cluster typology and not vice-versa.

The 'matching' between the groups classified in the taxonomy and the 12 cluster analysed was organised according 3 main characteristics :

1) **territorial dimension**, that refers to the industrial milieu in which the case study is placed. The items for defining such a dimension were: a well identifiable socio – geographic context, in which a group of SMEs operate in a prevalent productive sector in a given quite concentrated area. A widespread supply of service (from information, to training, to export and promotion and R&D..) is present in the area. The sense of belonging is strongly encouraged by the historical and cultural links between companies and territorial dimension. Amongst the reasons to operate in the area: good labour base, link with local community, quality of life, proximity to other firms. Finally, the presence of an education system playing a key – role for the local industries' qualification and a tailored policy-making.
2) **morphological dimension**, that refers to the way and the reason the ***companies*** belonging to the case studies ***are grouped together.***

Using the notion of cluster the variables to be taken into consideration were:

- ü group of spatially concentrated SMEs in one particular sector;
- ü productive links between companies operating in the same industrial milieu
- ü links between large enterprises and small companies
- ü shared cultural identity

- ü regional and/or sectoral policies supporting the cluster (i.e. the aggregation and the links between spatially concentrated firms belonging to a particular sector)
- ü well identifiable companies core competencies.

Thus networks were defined by:

- ü not-hierachical group of SMEs sharing and promoting a common, well identifiable project and/or service
- ü hierarchical group of SMEs sharing and promoting a common, well identifiable project and/or service
- ü not-hierachical group of firms around a central actor (a leading firms, a research centre, ...) working jointly for a common project
- ü hierachically integrated group of firms around a central actor working jointly for a common project
- ü group of firms around a central actor (a leading firms, a research centre, ...) sharing common services
- ü group of professional associations and/or local institutions working for a shared, common project not-hierachical group of SMEs sharing and promoting a common, well identifiable project and/or service

3) **organisational set – up**, that refers to the way the network or cluster ***policy have been defined***.

Within this dimension the ***bottom up*** approach was intended as a set of variables, such as:

- ü participatory policy making on the behalf of local authority involving directly SMEs in the process of decision taking
- ü cluster or network management structure (formal or informal) promoted directly by local companies
- ü cluster or network management structure (formal or informal) promoted by professional associations/local trade involving directly the SMEs beneficiaries in the policy making process and/or decision taking
- ü new service supporting the companies set up directly by the beneficiaries companies (or with their direct and explicit involvement)
- ü joint-projects promoted and carried out directly by the beneficiaries companies (or with their direct and explicit involvement)

As for the ***top down*** approach the variables considered were:

- ü prevalent role of public actors in setting up and or promoting services to local SMEs
- ü prevalent role of public actors in promoting partnership and joint project between local companies
- ü not-participatory policy making on the behalf of local authority not involving directly SMEs in the process of decision taking
- ü cluster or network management structure (formal or informal) promoted by professional associations/local trade not involving directly the SMEs beneficiaries in the policy making process and/or decision taking

Using as ***information source*** the case-studies and the base-line results the following taxonomy has been identified:

Kind of cluster	**main characteristics**	**case studies**
Group 1: porterian cluster	Ö **TERRITORIAL DIMENSION** The cluster is placed in a well identified industrial milieu where: (a) a well identifiable prevalent productive sector exists in a give quite concentrated area; (b) a widespread and tailored (e.g. sectorialised) supply of services for local companies is available; (c) a well identifiable education systems plays an important role for the local industry qualification; (d) quite huge historical and cultural links are present between the companies and the territorial dimension; (e) among the different reasons to operate in the area the local good labour base prevails. Ö **MORPHOLOGICAL DIMENSION** **Cluster:** The cluster takes the form of: (a) a group of spatially concentrated SMEs belonging to one particular sector; (b) there are productive links between companies operating in the same industrial milieu; (c) the companies core companies are easily identifiable and they concern production skills. **Network:** No one relevant networking activity has been found Ö **ORGANISATIONAL SET-UP** Not a relevant one has been identified due to the typical "spontaneous" cluster identity mainly focused at micro level (single entrepreneur) Ö **FURTHER REMARKS:** Tacit and informal knowledge plays an absolutely prevalent role	à PRATO (IT4)

kind of cluster	main characteristics	case studies
group 2: porterian cluster comprising well-identifiable networks (sort of sub-clusters). The above networks (sub-clusters) can be originated or by: **2.1.** prevalent **top-down** approach (i.e. through the strong impulse of policy makers without a direct involvement of beneficiaries SMEs); or by: **2.2.** prevalent **bottom-up** approach (i.e. through the involvement of SMEs).	Ö **TERRITORIAL DIMENSION** The cluster is placed in a well identified industrial milieu where: (a) a well identifiable prevalent productive sector exists in a give quite concentrated area; (b) a widespread and tailored (e.g. sectorialised) supply of services for local companies is available; (c) a well identifiable education systems plays an important role for the local industry qualification; (d) historical and cultural links are present between the companies and the territorial dimension; (e) among the different reason to operate in the area the local good labour base and the proximity to other firms prevail. Ö **MORPHOLOGICAL DIMENSION** **Cluster:** The cluster takes the form of: (a) a group of spatially concentrated SMEs belonging to one particular sector; (b) there are productive links between companies operating in the same industrial milieu; (c) the companies core companies are easily identifiable and they concern: production and product innovation skills. **Network:** A quite relevant networking attitude can be found mainly through: (a) not-hierarchical group of firms around a central actor working jointly for a common project; (b) group of firms around a central actor sharing common services; (c) group of professional associations and/or local institutions working for a shared, common project Ö **ORGANISATIONAL SET-UP** Two main sub-groups have been identified: **2.1. Bottom-up led** mainly through a: (a) participatory policy-making on the behalf of local	***2.1. bottom-up*** à MIRANDOLA (IT3) à BIELLA (IT2) à BRIANZA (IT1) à TOYS (FR1) ***2.2. top-down*** à BASQUE 1 (ES1) à BASQUE 2 (ES2) à AUSTRIA (AT1)

	authority involving the SMEs in the process of decision taking; (b) a cluster or network management structure (formal or informal) promoted by professional associations/local trade involving the SMEs beneficiaries in the policy making process and/or decision taking. **2.2. Top-down led** mainly through a prevalent role of public actors: (a) in setting up and or promoting services to local companies; (b) in promoting partnership and joint projects between local companies. Ö **FURTHER REMARKS:** Tacit and informal knowledge prevails but a growing attention is placed on formal knowledge (perceived as necessary for preserving or strengthen competitiveness)	

kind of cluster	main characteristics	case studies
group 3: cluster takes the form of a network of companies belonging to the same industrial milieu. Even in this case the network could be:: ***3.1. top-down*** or ***3.2. bottom up*** led	Ö **TERRITORIAL DIMENSION** The territorial dimension is relevant but there is not a prevalent industrial sector prevailing in the area. More particularly, the territorial dimension mainly concerns: (a) the mere socio-geographic context; (b) a widespread supply of services for local companies (not sectoral services); (c) a good local labour base and close to market as the main reasons to operate in the area. Ö **MORPHOLOGICAL DIMENSION** **Cluster & Network:** The typical "porterian cluster" does not fit with this group. The case studies belonging to this group can be labelled as networks operating in a given geographical area. In the UK case study, the networks mainly concerns: (a) a not-hierarchical group of SMEs sharing and promoting a common well identifiable project and/or service; (b) a not-hierarchical group of firms around a central actor working jointly for a common project; (c) a group of firms around a central actor sharing common services. In the French case, the network takes the form of: (a) a group of professional associations and/or local instututions working for a shared common project. Ö **ORGANISATIONAL SET-UP** The UK case can be considered as **3.1. bottom up led** (the networks are promoted directly or by local companies or by local trade involving the SMEs beneficiaries in the policy making process) while the French case seems to be more **3.2. top down led** (as the public actor seems to play one of the most relevant role and the professional association/local trade promoting the network seem not to directly involve the SMEs beneficiaries in the policy making process) Ö **FURTHER REMARKS:** Tacit/informal and explicit/formal knowledge seems to be balanced and equivalent	3.1. ***bottom up*** à Automotive UK (UK2) 3.2. ***top-down*** à REFLEX'OISE (FR2)

kind of cluster	main characteristics	case studies
group 4: cluster takes the form of a network of companies not belonging to the same industrial milieu.	Ö **TERRITORIAL DIMENSION** No one relevant links, if any, can be found with a well defined industrial milieu Ö **MORPHOLOGICAL DIMENSION** **Cluster & Network:** The "porterian cluster" does not fit with the case studies belonging to this group. Both of the case studies can be labelled as network. Ö **ORGANISATIONAL SET-UP** Within this group, the Plato case takes the characteristics of a **top-down led** network (for the prevalent role of public actors in promoting partnership and/or joint project between local companies), while the AFN seems to be more properly **bottom-up led** (due to the fact that the network is directly promoted by the companies). Ö **FURTHER REMARKS:** Concerning knowledge, its main characteristic seems to be top-down led (see the role of Plato Committee and the AFN founder).	à PLATO (NL1) à ASIAN FAMILY (UK1)

In order to facilitate the policy options selection, for each case study, a summary of the most relevant policy identified has been drawn up.

A cross reading of the above summary sheets grouped according to the cluster taxonomy identified in the previous section permits to underline the following general remarks, related to kind of policies implemented at different levels:

Group 1:	
3 Prato (IT1)	Micro level : ætraining policies
	Micro level: æfirm productive link s and integration
Group 2:	
3 Basque (ES1)	Meso level: æ employment and training policies
3 Basque (ES2)	Meso level : æ R&D policies
3 Styria (AT)	Micro level : æ training policies and need analysis monitoring
3 Mirandola (IT3)	Meso level: æ tailored service supply
3 Biella (IT2)	Meso level: æ co-operation between the cluster actors
3 Brianza (IT3)	Micro level: æ training supply
3 Toys (FR1)	
Group 3:	
3 Reflex'Oise (FR1)	Meso level: æ high qualified service supply
3 Automotive (UK2)	Meso level: æ support the business system
	Micro level :æ networking
Group 4:	
3 Plato (NL)	Meso level: æ small firm's up-grading through mentorship
3 Asian Family (UK1)	Micro level: æ entrepreneurership development

§ § §

The very final step of the DELOS project was to build a **reference models identification and suggestions** which made an attempt to provide both a conceptual framework within which organisational learning in SMEs and SME clusters can be depicted and understood, as well as a set of practical tools and Guidelines to assist policy and practice-oriented actions to support training and employment within the SME sector.

Industrial clusters as Learning Organisations: a typology

Co-operation between organisations within markets has long been identified as a factor in economic success. As Alter and Hage (1993) argue, networking between organisations contributes to stability and reduces uncertainty. Such networks can evolve over time - as 'natural' clusterings of firms, or can be 'induced' artificially as a result of interventions like the development of business or science parks. There is little consensus on how industrial clusters can be defined and mapped. Some approaches, for example those influenced by the work of Marshall, consider the structural relationships of networks, focusing on three main types of cluster: those generated through labour market effects; those shaped by supply relationships and those emerging as a result of the transfer of information between firms and research and development institutions (technological spill-over). Others, for example, those influenced by the work of Porter place more emphasis on the institutional nature of inter-organisational arrangements, and particularly the extent to which collaborative 'learning' is facilitated through institutional frameworks imposed from above, or at a 'grass roots' level. As with SMEs individually, it is assumed that the nature of inter-relationships within particular clusters will be shaped by features such as how long clusters have been established; their 'embeddedness' within the industrial milieu; existing institutional arrangements (for example the prevalence of training infrastructure) and market sector and position.

In order to model the effects of different configurations of these features, the DELOS field work encompassed a range of different types of cluster, as shown in the previous part of that section.

Using both the baseline survey, together with intensive case studies in each cluster, involving:

- an environmental and socio-economic mapping (labour markets; economic structure; sectoral and market features; size distribution)
- documentation analysis (of available reports on institutional actors; training infrastructure etc)
- in-depth interviews with key actors

DELOS examined how organisational learning at the cluster level relates to structural and institutional features. To a large extent, the approach mirrors our exploration of organisational learning at the level of the individual SME, as outlined in the preceding section, with a focus on:

- the categories of learning (information; new knowledge; competencies)
- the processes of learning (learning-by-doing; on the job learning)
- institutional thickness and network embeddedness (the role of culturally-constructed identity)
- structural/morphological features (size; longevity; market position and sector).

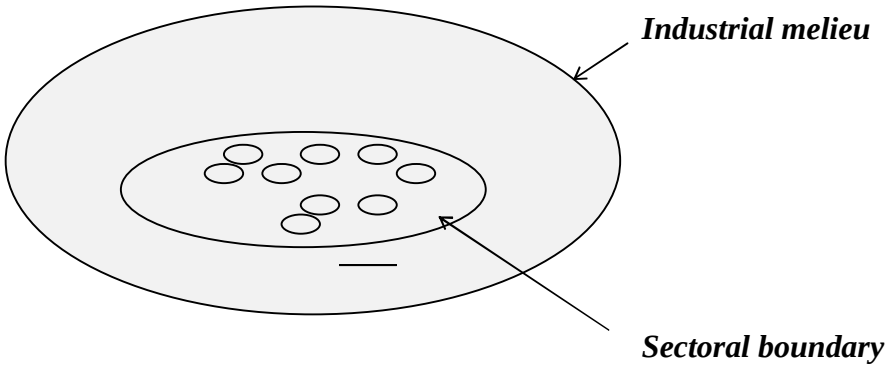
A particular emphasis in this part of the analysis, however, was on examining how organisational infrastructures within 'clusters' serve to encourage organisational learning at the aggregate level. Such structures can be best seen as boundary-spanning or bonding agents that serve to consolidate collaborative interactions between individual SMEs within particular clusters, and encompass many different forms, from regional authorities through Chambers of Commerce. Ultimately, therefore, the analysis aimed to develop a cluster typology combining structural, institutional and organisational features and to assess whether such configurations - what might be termed the 'learning environment '-could be equated with particular patterns of organisational learning - what might be termed 'learning practices' - at the aggregated level of the cluster.

For the first part of the equation - the organisational learning environment -(relating socio-cultural embeddedness to morphological and organisational factors) - we considered how the case study clusters reflected the following elements:

Dimension	***Main elements***
Industrial milieu	Social and cultural identity Degree of concentration or differentiation of activity base Historical and cultural links between firms and socio-cultural context Degree of spatial 'boundedness'
Morphological dimension	network structure: hierarchical; dispersed; central actor extent of regional/sectoral policies supporting networks commonality of competence structure
Organisational infrastructure dimension	Cluster/network management structure Involvement of SME representation in policy-making and decisions

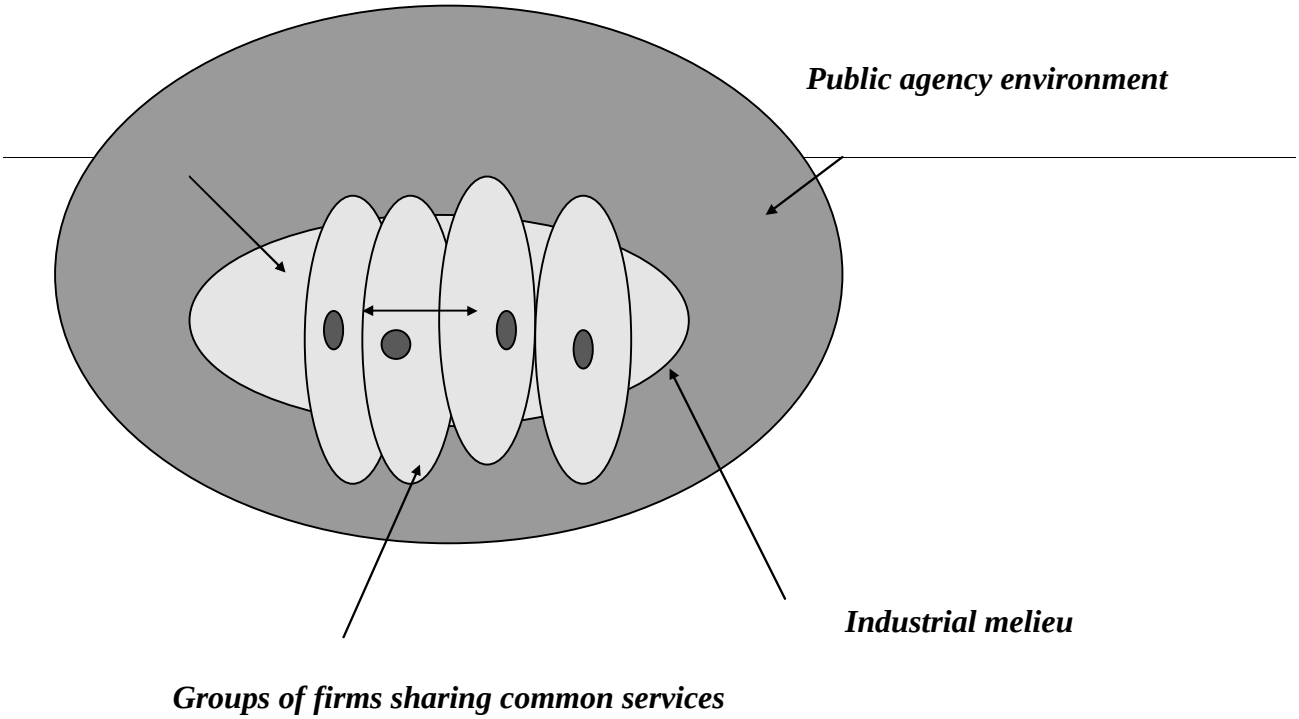
On this basis, five types of 'cluster configurations' can be identified, as follows:

Type 1: Porterian



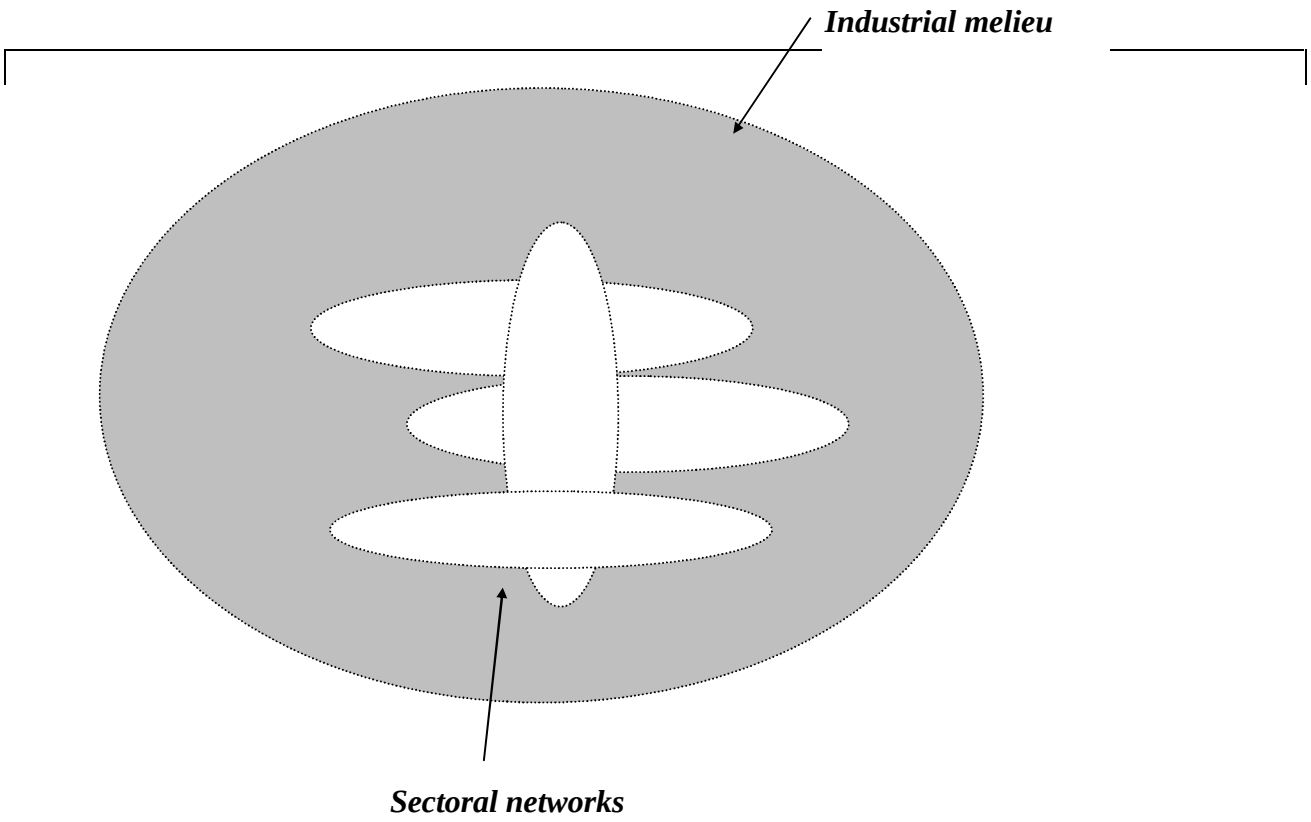
Porterian - **This type of cluster is situated in a clearly defined industrial melieu, which has well-grounded historical roots and a highly developed cultural identity. The territorial cohesiveness of the cluster reinforces and is reinforced by sectoral homogeneity that provides for collaborative networking between SMEs working in similar markets and production relations. Governance structures tend to be flexible and spontaneous.**

Type 2: Segmented Porterian



Segmented Porterian -This type of cluster shows similar characteristics to the first type, in that it occupies a well-defined socio-cultural setting with a strong sense of local identity. However, interactions between SMEs within the cluster are also shaped by differentiation in producer-suppler relations and in different market positions and niches within the market. Networking is therefore characterised by loose associations grouped around a central actor; professional associations or a common service base. Governance structures and communication systems are more formalised than in the first type and will typically take the form either of: participatory management structures supported by local agencies; autonomous management through professional associations, or partnership structures administered by local authorities.

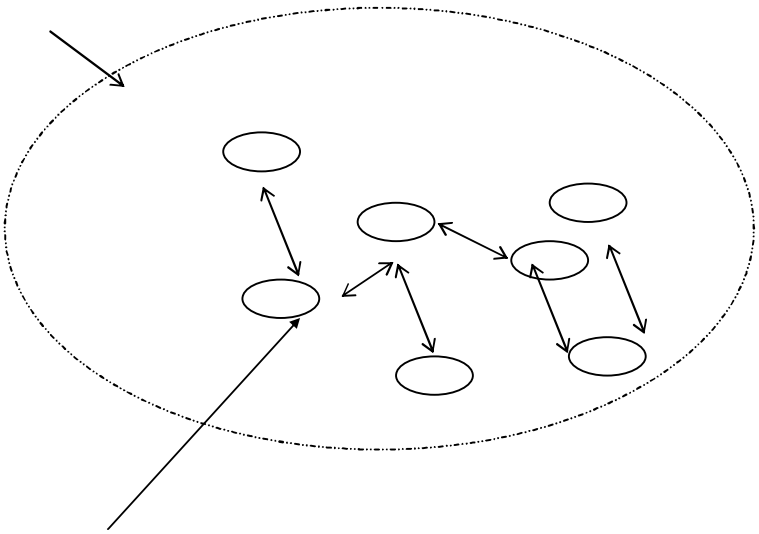
Type 3: Interlocking



Interlocking *- This type of cluster is spatially bounded, but its territoriality is not derived from a particularly anchored socio-cultural identity. Rather, constituent firms working within the cluster have forged links as a result of common interests related to their particular positions within a complex local economy. As a result, this type of cluster is sectorally differentiated rather than mono-sectoral, and its networking arrangements consequently are diverse, ranging from loose interest groups formed primarily for promotional purposes through to professional associations within a common project.*

Type 4: Induced partnerships

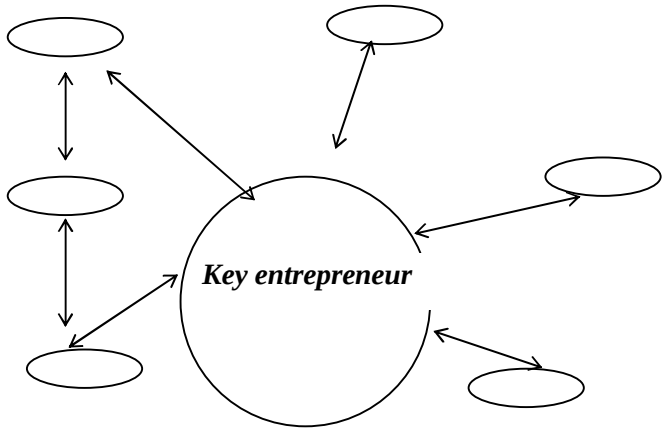
Centralised partnership structure



Dispersed networks

Induced partnership *- The main characteristic of this type of cluster is the key role played by external (i.e. non community-based) agencies in formulating a common identity, and in co-ordinating organisational learning within the cluster. Public service actors such as Development Agencies, typically provide communications and decision-making structures that may also be reinforced and supported through central services (for example research and development links with business associations).*

Type 5: Virtual cluster



Virtual cluster *- The virtual cluster is primarily characterised by the absence (or low importance) of territoriality as a bonding agent or boundary spanner in the development and sustainability of collaborative networking. In the case intensively studied through DELOS, this type of cluster was represented by a national network of family enterprises bound together by a common history and common objectives, with a dominant role played by key entrepreneurial decision-makers, and focused on a particular spatial 'nerve centre' - the historical origin of the network. Other examples, however, include virtual networks or associations with a common activity base, linked together through information and communication technology infrastructure.*

Relating organisational 'learning environment' to 'learning practices'.

Do the learning environments identified promote particular types of 'organisational learning' within clusters? To a large extent this is the case. The Table below shows the results of an analysis involving comparing the DELOS case studies - and the types of 'learning environments' identified -, in terms of their industrial milieu, morphological and organisational structure characteristics, with the type of 'learning practices ' prevalent, in order to arrive at a typology of organisational learning for clusters. As the Table shows, five types of cluster learning organisations were identified, with a relatively tight 'goodness of fit' between 'learning environment' and 'learning practices'.

L.Organisation Type	**Type 1**	**Type 2**	**Type 3**	**Type 4**	**Type 5**
Learning environment type	Interlocking	Segmented	Mix 1, 2 and 3	Induced	Virtual

Embeddedness	Low	Low	High	Very high	Low
Characteristics of firms	Small New start-ups Mainly supply to contractor	Larger, long-established. Typically subsidiaries. Diversified production/supply chain	Small, newer firms. Diversified supply base. Independents	Small; independent. recently establsihed. Direct suppliers to customer.	Partnerships between diversified local companies.
Communications structure	Competitive entrepreneurial	Loose associations; paertnership	Networks of entrpreneurs	Highly centralised	Top-down institutional agency
Information gathering	Mainly in-house, shared ad hoc	Opportunistic	Strategic collaboration	Centralised from dominant entrpreneur	Promoted through agency
Knowledge acquisition	Variable	Variable	Variable	Mainly within cluster	Strategic
Competence Development	Primarily informal; learning by doing	Primarily formal training	Mix formal and informal training	Mix of formal and informal training	mentorship

Organisational Learning and Economic Performance

What effect does organisational learning have on economic performance? We addressed this key question at two levels: at the level of the individual SME, and at the level of the 'cluster', in order to assess the extent to which clusters add value to individual SME competitiveness. It should be stressed that the measures used to statistically analyse relationships between 'performance' and other structural and behavioural indicators (as set out below) are based on two key surrogates of performance - turnover and alef-reported strengths of the firm - that have only limited usefulness as a measure of 'success'. Ideally, measures of 'cluster' success at the aggregate would need to reflect more robust (and more objective) factors such as regional gross domestic product.

i) At the level of the individual SME, the baseline survey data from 323 SMEs were analysed using two surrogate measures of 'success' as dependent variables: the first measure was reported increase or decrease in turnover, and the second perceived strengths of the SME (measured on a range of items including management structures; production system; personnel; quality of products and so on). These two variables were analysed in relation to scores on the 'organisational learning' dimensions, and in terms of two structural indicators: size of firm, and length of time established. Three separate analyses were carried out:

- correlation analysis, with turnover increase and reported 'strength' as dependents and organisational learning indicators as independents
- a regression analysis, with turnover increase and reported 'strength' as dependents and organisational learning indicators as predictors

- a multiple classification analysis (MCA) with turnover and strength as dependents, size and length of time established as independents and organisational learning variables as covariates.

The results of the correlation analysis were:

- Only weak, and contradictory, associations were identified between performance measures and organisational learning indicators. In general, higher increases in turnover tend to be associated with lower levels of 'organisational learning' across all three levels. Increase in turnover was only significantly associated with a high use of informal information gathering (e.g. chambers of commerce; interaction with other firms) (r=0.1145) and with a lower level of usage of external knowledge acquisition strategies (r=0.1906). However, strength was significantly associated with embeddedness of the firm in the industrial milieu (r=0.1994); with strategic information gathering (r=0.2482); and with informal competence development strategies (p=0.4317) - family mentorship and on-the-job training.

The results of the regression analysis are summarised in the following table:

Dependent	**R sq**	**F ratio/sig**	**Sig Variables**	**T ratio/sig**
turnover	0.05	8.42 0.0003	External KA Informal competence development	3.43 0.007 2.14 0.032
strength	0.22	46.19 0.000	Informal information-gathering Informal competence development	7.15 0.000 -3.9 0.001

The Table shows:

- The regression supports the conclusion of the correlation analysis that external knowledge acquisition strategies (e.g. mobility initiatives) is negatively associated with performance, as measured by increase in turnover. Similarly, it also supports the relationship identified between use of informal competence development strategies and 'strength' of the firm'.

The results of the multiple classification analysis were:

- Increase in turnover is weakly shaped by size of firm (f=3.613, p=0.028), with larger firms reporting higher increases in turnover than micro - enterprises. There was no significant effect on turnover found in relation to length of time the firm is established. The combination of organisational learning variables again makes a weak contribution to turnover (f=4.074; p=0.003), the main contribution attributable to utilisation of external knowledge acquisition strategies.

- Size of firm and length of time established were not found to make any contribution to variations in reported 'strength of the firm'. However, strength was significantly affected by organisational learning factors (f=20.71; p=0.000). The main learning factors affecting strength were informal information gathering (f=38.39; p=0.000) and informal competence development activities (f=12.71; p=0.000).

To summarise, ***at the level of the individual SME***:

- The relationship between organisational learning, structural features of SMEs and embeddedness in local milieu is complex. Although size would appear to be a contributing factor in increasing turnover, its contribution is limited. Embeddedness within the cluster does not appear to have a significant effect on turnover.
- Only external knowledge acquisition strategies appear to be consistently associated with changes in turnover, and these activities would appear to be negatively associated . However, the adoption of informal competence development activities (e.g. mentoring) is significantly associated with increases in SME turnover.

- As measured by reported strength of the SME across a number of indicators (e.g. management structures, quality of product, personnel quality) organisational learning does make a significant contribution. It would appear that the use of informal information gathering (for example links with Chambers of Commerce) and informal competence development practices (e.g. family mentorship and on the job training) have a positive effect.

ii) At the level of the cluster aggregated scores for each of the case study clusters were computed (except the Netherlands, for which data are not available) on growth in turnover; reported strength; degree of attachment to local milieu and the organisational learning indicators. . The scores were then ranked for each case. Using Kruskall-Wallis analysis of variance, the relative scores of each case study 'cluster' were then compared The Table below shows rank scores across the 12 cases for all the variables which showed statistically significant variations between clusters

Rank scores of DELOS clusters on key variables

Cluster	Rank on turnover growth	Embeddedness	Strategic Information Gathering	Informal Knowledge Acquisition	Formal competence dev	Informal competence dev
IT1	7	6	6	5	3	10
IT2	10	4	5	8	5	11

IT3	1	7	3	7	2	5
IT4	11	5	10	10	1	9
UK1	9	1	11	3	8	12
UK21	3	12	8	4	10	6
UK22	4	3	9	1	10	6
AT	6	8	4	5	6	2
ES1	2	10	2	9	12	4
ES2	5	11	7	12	7	3
FR1	12	9	12	11	4	8
FR2	8	2	1	2	9	1

The Table shows:

- Across all the indicators shown, there were significant variations in cluster scores In terms of 'performance', as measured by turnover increase Mirandola (IT3), the Spanish machine tool (ES1) and the UK TEC services (UK21) clusters have achieved highest growth rates in turnover, with Biella (IT2), Prato (IT4) and Jura (FR1) showing the biggest decline.

- Success, in terms of turnover increase, does not appear to be related to embeddedness within the local milieu, since the three highest scoring clusters occupy the lowest quartile in terms of scores on this indicator. Indeed, some highly embedded clusters in North Italy have shown the lowest levels of performance, suggesting that membership of a cluster, as argued above in Section 2 of this Report, can in some cases be a barrier to success.

- The contribution of organisational learning within clusters to performance is not uniform across all clusters, and the relationship between learning strategies and performance is complex. For example Mirandola, the best 'performer' in terms of increase in turnover, is also ranked high on utilisation of formal competence development practices, whilst the Spanish machine tool cluster - the second best 'performer' - ranks high on the adoption of informal competence development practices.

There were differences found between levels of performance and the type of cluster. The 'Interlocking' type on average shows higher turnover growth than other types, and the 'Segmented porterian' lowest.

Transferability of the cluster model

The final research question addressed by DELOS is whether the concept of the cluster as a context for the development of organisational learning amongst SMEs is a European-wide construct that can be applied across socio-cultural and geographical boundaries.

The DELOS field work strongly suggests that there is no one universal type of 'cluster' or SME cluster. Our analysis suggests a typology of five cluster types (or 'organisational learning environments') that are broadly consistent with five types of organisational learning practices. These different types represent different configurations of socio-cultural embeddedness; structural features; communications and collaboration structures and learning arrangements.

This conclusion is reinforced by comparing the relative representation of SMEs surveyed in the DELOS case study clusters within the five broad 'learning organisation types' identified above, as illustrated in the Table below. If the industrial district exerts a strong 'pull' on the learning behaviours of individual SMEs, then we would expect the distribution of firms in a particular cluster to be concentrated in a particular organisational learning type.

Cluster	Type 1	Type 2	Type 3	Type 4	Type 5
IT1	17	21	14	5	43
IT2	15	8	18	3	56
IT3	5	0	33	14	48
IT4	7	0	67	0	26
UK1	0	0	0	6	94
UK2.1	88	0	0	0	13
UK2.2	22	0	0	6	72
AT	30	46	3	14	8
ES1	50	9	0	41	0
ES2	37	37	7	19	0
FR1	21	0	58	11	11
FR2	3	0	0	65	32

The Table shows:

- There are significant variations in the relative representation of DELOS clusters within the organisational learning types derived (chi square 369.13; df= 44 p=0.0000)

- This pattern suggests that, in general, membership of a particular 'industrial milieu' does not imply conformity to a particular socio-cultural, organisational or pedagogic context. SMEs within clusters are

largely heterogeneous rather than homogenous. The notion of clusters as archetypal learning organisations, commonly found across cultural and geographical boundaries, is therefore difficult to sustain.

- However, the analysis does suggest that some SME clusters are highly homogenous. The Prato cluster is highly concentrated in Type 3, and the Asian Family and Reflexoise clusters in Type 4 and Type 5. Other homogenous clusters include the UK TEC SMEs, the Austrian metals and the Spanish automotive cluster. These patterns reinforce the conclusion that the 'cluster' does exert strong centralising influences under certain conditions. These influences are likely to be most pronounced in the 'interlocking' and 'virtual' cluster types.

§§§

At the end the DELOS project intends to present **recommendation**d, to ***give operational indications capable of supporting training and employment policies in favour of SMEs***, and considers the following research questions:

- how skills and training needs of individual SMEs can be aggregated at the level of the cluster
- what are the key focal points within SME clusters that could profitably be harnessed towards maximising organisational learning
- what support systems exist within SME clusters to favour development and transfer of competencies and how could these be enhanced
- how do SMEs and SME clusters monitor their existing competencies and their skills needs, and what are the main deficiencies of this process

The recommendations were structured firstly, with a set of guiding principles and secondly with a set of analytical tools to support policy for SMEs.

The *Guiding Principles* support policy aimed at providing:

- training
- support for R&D
- support services to enterprises.

and addressing the following target audiences:

- The European Commission
- Member States
- Regional agencies
- SME institutions (e.g. chambers of commerce)

- Analytical tools are intended to help the above target audiences assess the training needs of SMEs both at the level of the firm and at the level of the industrial cluster. They cover the following elements:
- an *environmental auditing tool* to identify the type of cluster and its features
- a *'skills auditing'* framework/methodology to enable localised skills needs to be identified

This set of mapping (and, broadly, diagnostic) tools intended to facilitate collaborative 'learning' within clusters of SMEs sharing common sectoral, territorial and organisational 'spaces'. These tools are shaped by a number of 'guiding principles' derived from the DELOS results.

The results of DELOS suggest that:

1. There is no one archetypal 'cluster' model that can be applied to European SMEs in general. Clusters or clusters have either evolved through time or have been induced following a particular institutional intervention. Such clusters take a number of forms, and reflect different configurations of cultural identity, institutional form, market position and networking arrangements.

2. The existence of a territorially, culturally or institutionally bounded cluster does not necessarily imply that constituent SMEs operating within that cluster engage in 'organisational learning' or that the cluster constitutes an aggregated 'learning organisation'.

3. 'Organisational learning' and the SME cluster 'learning organisation' are broad conceptual frames that, in practice, encompass wide variations in the ways SMEs within a cluster engage in dialogue, knowledge sharing and strategic behaviours. There was little evidence in DELOS of clusters of SMEs systematically engaging in the kind of high level collective strategic learning behaviours associated with accepted definitions of the 'learning organisation'.

4. Neither is there evidence of a clear, causal association between collaborative learning and cluster 'success', in terms of factors such as economic performance. Indeed, the DELOS study identified instances where a high level of collaborative dialogue and knowledge sharing within clusters was associated with relatively poor economic performance.

5. These conclusions imply different levels of 'goodness of fit' of prevailing local conditions, in terms of the extent to which they: enhance or constrain SME organisational learning , employment and economic performance, and : provide scope for adjustment or adaptation to economic change. 'Organisational learning' does not take place everywhere, and where it does take place it does so in different ways.

On the basis of the above principles, the 'toolkit' set out below is intended to encourage reflexive evaluation of local conditions in clusters with a high proportion of SMEs . The mapping tools are therefore intended to help decision-makers involved in the provision of training and support services design and plan appropriate policies, policy instruments and actions to assist SMEs. It should therefore be stressed that they are tools to promote reflection rather than a set of 'rule-based' diagnostics. It is essential that decision-makers avoid the temptation to be reductionist and mechanistic in pursuit of the perfect 'learning organisation'.

Cluster Appraisal Toolkit

We begin with a checklist to enable an appraisal of the cluster to be carried out. The checklist is intended to:

- Establish whether the locale being appraised constitutes a 'cluster' of SMEs
- Establish broadly what type of cluster it is, in terms of its: territorial, sectoral, morphological and organisational characteristics
- Identify the strengths and weaknesses of the cluster
- Relate these strengths and weaknesses to designing 'learning arrangements' intended to maximise the competitiveness of the cluster
- Identify the 'learning content' to be delivered through appropriate learning arrangements.

Step 1: Establishing the cluster 'if' and 'what type'.

The object of this exercise is to establish how far a particular 'locale' constitutes a cluster, i.e. exhibits both structural and behavioural characteristics that do or could facilitate collaborative and collective learning.

To make this appraisal, an 'environmental audit' of the locale is necessary. This audit is comprised of three exercises, using the three frameworks shown below, i.e.

1. Territorial mapping.

This identifies two main dimensions (and related attributes) for the cluster:

- its economic and market characteristics
- its socio-cultural base (community emebededness and identity).

Using the framework:

- make a description of the cluster attributes for each dimension listed
- make a judgement of whether each attribute is a strength or a weakness. You can use a 'rating scale' to apply a quantitative measure of how strong or weak.

2. Morphological mapping

This identifies the organisational and institutional characteristics of the cluster, its market characteristics and the nature and strength of collaborative networks, in terms of:

- size and recency of constituent firms
- characteristics of the market (stable or dynamic)
- type and degree of inter-firm collaboration
- type and nature of institutional management of cluster (influence of external agencies).

As for the territorial mapping, using the framework:

- make a description of the cluster attributes for each dimension listed
- make a judgement of whether each attribute is a strength or a weakness. You can use a 'rating scale' to apply a quantitative measure of how strong or weak.

3. Organisational Learning Arrangements Mapping

This exercise is designed to identify the infrastructure that exists to facilitate 'organisational learning' within the cluster; strengths that can be capitalised, and weaknesses or gaps that need to be addressed. The mapping exercise focuses on four dimensions:

- processes

- mechanisms
- actions
- actors

As with the other two exercises, using the framework:

- make a description of the cluster attributes for each dimension listed
- make a judgement of whether each attribute is a strength or a weakness. You can use a ‘rating scale’ to apply a quantitative measure of how strong or weak.

Step 2: Establishing the cluster type linking cluster type to an appropriate 'organisational learning scenario'.

The mapping exercise will provide sufficient data to enable a decision-maker to situate the cluster in one of the five cluster types identified by the DELOS project.

On this basis, and using the data generated by the environmental audit exercise, use the table below to locate the cluster within the DELOS typology.

	PORTERIAN	**SEGMENTED**	**INTERLOCKING**	**INDUCED**	**VIRTUAL**
TERRITORIAL					
Economic homogeneity	high	differentiated; niche markets	differentiated	diversified	high
cultural homogeneity	high	high	low	low	high
MORPHOLOGICAL					
Size	small; new	larger; well-established	variable	variable	small; independent
Market	stable	stable	dynamic	adaptive	stable
Interaction	socially-shared; entrepreneurial	Loose associations	interest groups	induced	centralised
Agency effects	self-governing	Participatory; professional associations	Variable. Some local agency involvement	top-down; agency-promoted	absent
LEARNING ARRANGEMENTS					
Process	internal; work-based	aek; strategic	aek; problem-solving	TQM; problem-solving	internal; work-based
Mechanism	informal exchange	benchmarking; feedback mechanisms	benchmarking; feedback	steering groups; agency-based	informal exchange
Actions	oral; fora	training systems	variable, informal and formal	databases; IT systems	oral; newsletters
Actors	entrpreneurs; employers groups	partnerships; professional associations	partnerships; professional associations	agency/SME collaboration	mentors

Step 3: linking cluster type to an appropriate 'organisational learning scenario'.

Generally speaking, a particular type of cluster will broadly be associated with a particular strategy that is intended to promote 'organisational learning' within the cluster. This exercise is intended to help decision-makers make a judgement on the overall 'learning scenario' that is appropriate for a given cluster type. The specific learning arrangements put into place within this broad learning scenario need to be informed by reflecting on the detailed results of the environmental audit.

A 'learning scenario' defines an overview of the general pedagogic arrangements designed to facilitate collaborative learning, based on:

- The learning paradigm (whether transmissive - top-down; didactic pedagogic approach - situated - embedded in community values, agendas and interactions ; self-managed - based on loosely self-autonomous and self-organised approaches)
- Key delivery systems - the mechanisms used to promote learning
- Setting - the physical and organisational spaces in which learning takes place. Generally they are bounded (e.g. a central place such as a development agency, TEC)
- or unbounded (e.g. loose networking arrangements).

The framework allows a particular type of cluster to be positioned in relation to an overall 'learning scenario'.

CLUSTER TYPE	**SCENARIO**	**Learning paradigm**	**Key delivery systems**	**Typical setting**
Porterian	Clearing House	Situated; collective-based	Best practices Work-based Mentoring; Oral	Social and community loci
Segmented	Distributed	Group collaboration and interaction	IT distributed networks; databases	Unbounded - co-operatives; chambers
Interlocking	Self-managed nodal	Autonomous	Databases; labour market and sector data	Professional: associations
Induced	Classroom	Didactic: top-down agenda	'One-stop-shop'; central services	Bounded: universities; company; agency
Virtual	Self-managed autonomous	Didactic/transmissive; corporate agenda	Mentoring	'Home alone' - semi-autonomous networks

Step 4: Filling in the details

Step 3 is intended to help decision-makers arrive at an overall strategy or 'learning scenario' to facilitate collaborative learning within the cluster. In order to 'flesh out' this scenario, two further actions are required:

- developing the learning *infrastructure*
- identifying and developing learning *content.*

Appropriate ***learning infrastructure arrangements*** will be shaped by the results of the organisational learning mapping carried out in Step 1 above.

This will have identified:

- the existing infrastructure (training service facilities; informal networking structures) that can be capitalised on
- particular weaknesses of the learning infrastructure in the cluster
- gaps that need to be filled.

Appropriate ***content areas*** to promote organisational learning within SME clusters are informed by the implementation of a skills audit. A framework for this exercise is set out below. This is composed of three elements:

1. Organisational Learning Audit
2. Domain competence audit
3. Cross-job skills audit

These tools enable an appraisal to be made at the level of the SME and at an aggregated cluster level of:

- the relative representation and strengths of the three types of 'organisational learning' elements identified by DELOS.
- skills gaps in relation to core domain skills (e.g. production techniques in the cluster sectors)
- skills gaps in relation to cross-job competencies.

The outcome of the audit depicts:

- the relative balance between information-gathering, knowledge acquisition and competence development
- any major skills and competence gaps

in order to help shape planning and decision-making.

1. Territorial mapping Framework

	Economic	Socio-Cultural
Macro	What are the general strategic national conditions (socio-economic, techno-economic, political institutional) within which clusters/networks are located? Are there particular economic, industrial, science and technology policies and infrastructure that promote and support the cluster/network? What sectoral based policies for economic support are in place and how do these relate to the local/regional dimension?	What are some of the ways in which global cultural flows (cultural homogenisation) intersect with national/regional cultural processes and identities?
Regional	Is there an historic economic base to the region? How has this evolved over time and in what ways has it shaped the economic activities of clusters and networks? How has any economic restructuring at regional level impacted on the stability of networks?	Do the political authority and governance structures shape the form of cluster/network activity? What is the 'social atmosphere' in the region (sense of 'community' or self-identification with a region)? What are the normative elements of the region (eg strongly developed common value systems which clearly define and sanction acceptable/non-acceptable forms of economic behaviour)?
Local	In what ways are the economic activities of the cluster/network linked with wider regional/national/global economies? How much stability is there in the local business environment? What is the labour market profile and nature of labour mobility in the local economic area/cluster?	How homogeneous are the network members (extent to which they share the same backgrounds eg class, gender, familial ties, religion, institutional ties, political outlooks, etc.)? Is there a shared cultural identity? Is there a normative commitment to act in particular ways eg. to follow a particular industrial policy agenda?

2. Morphological mapping Framework

Cluster	Focus	Questions
	Nature of cluster	? What is the size and composition of firms in the cluster/network?
	Economic activity	? What is the basis for their industrial competitiveness (knowledge, information, innovation etc.)? ? What are the likely trends in the evolution of technology, markets and competition in the sector(s) within the cluster/network? ? What is the dominant 'industrial competitiveness' paradigm (or strategy) of the cluster/network? ? What is the market shape (nature of customers/suppliers; relations with customers, etc.) of the cluster/network? ? To what extent are the various parties (firms, customers, suppliers and competitors) involved in the same transactional network?
	Institutional infrastructure	? What actors and agencies, promoting or supporting the socio-economic activities of the cluster/network, exist within the 'case'? ? What is the nature and level of interaction among the different kinds of institutions, including the firms, that comprise the 'case'? ? What mechanisms are there for collective representation? ? What mechanisms are there for the creation of socially-shared beliefs which guide strategic choices?
	Organisational structure	? How is the network/cluster organised? - how loosely/tightly bounded ? - is there a cluster management? - is there a formal structure? - how do actors in the cluster/network communicate? - what is the main vehicle of communication and exchange? ? Is there a mutual awareness that the firms or enterprises are involved in a common enterprise?

3. Organisational Learning Infrastructure Mapping

	Processes	Mechanisms	Support Actions	Actors
Intra-organisational	? TQM ? systematic problem solving ? continuous improvement ? acquiring external knowledge (eg market intelligence)	? steering ctte for quality process ? action learning/quality circles ? team working/problem solving teams ? customer/supplier feedback mechanisms ? benchmarking	? learning strategy for org ? IT systems for info exchange and feedback ? self-development opportunities and reward systems	? individuals ? teams ? mentors/coaches
Inter-enterprise	? transferring/exchanging knowledge	? site visits ? short job secondments ? labour mobility within cluster ? benchmarking ? collaborative action learning on emerging socio-technical practices ? network meetings ? training events ? less focused exchange sessions ? informal exchange	? newsletters, reports. oral presentations ? compilation and dissemination of 'best practice' case studies ? labour market profiles and data bases ? IT systems to support inter-enterprise communication and coordination ? fora for the collective interpretation of information	? boundary spanners ? professional and technical institutes ? action learning catalysts ? advisory and facilitating agencies ? professional associations ? cluster assoc. management ? technology transfer institutions

	Processes	Mechanisms	Support Actions	Actors
Inter-enterprise	? acquiring external knowledge ? generating new knowledge	? joint research and intelligence gathering (on markets, relevant technologies and trends) ? joint production ? cooperative research ? collaborative action learning	? technology management and business strategy ? matching technology and organisational systems ? shared longer term orientation towards technological environment	? trade/industry and professional associations ? Chambers of Commerce ? consultants in marketing suppliers/customers /competitors ? agencies supporting organisational R&D ? specialised university research centres ? RTD departments in companies

LEARNING CONTENT APPRAISAL

1. Organisational Learning Audit

Element	Sub-element	Item	Score: 0 absent - 5 high level
INFORMATION-GATHERING	*Strategic*	Technical magazines Exhibitions and Fairs Data Banks Seminars and training sessions Government sources R&D Centres and Universities Buying in research	
	Informal	Local Business Associations Chambers of Commerce Other firms Informal learning Clients	
KNOWLEDGE ACQUISITION	*IN-FIRM*, adopting on-the-job-learning and mentoring inside the firm	mentoring on the job experience experts in the firm incorporation of new workers	
	EXTERNAL, adopting more conventional and formal learning processes	Sending staff to training courses Mobility initiatives from outside	
	COMMUNITY, predominantly drawing on expertise from within the local milieu	Mobility initiatives inside the cluster Collaboration with other firms	
COMPETENCE CONSOLIDATION & DEVELOPMENT	*Formal Learning*	Technical education Post graduate Specialisation Continuous training	
	Informal learning	Family Mentorship On the job learning Informal relations with businesses	

2. Domain competence audit

Competence category	**Types applicable to cluster:**	**Score: 0 absent - 5 - high level**
Production process skills		
Marketing skills		
Innovation skills		
Research skills		
IT development skills		
Organisational design skills		

3. Cross-job skills audit

Skill category	**Score** **0 absent** **5 high level**
A. Worker Attributes	
Aptitudes and Abilities: capacity to perform particular classes or categories of mental and physical functions, (e.g.) cognitive abilities (verbal, quantitative, abstract reasoning); spatial/perceptual abilities; psychomotor abilities; sensory abilities; physical abilities	
Workplace Basic Skills: fundamental developed abilities required to some degree in ALL jobs: reading; writing; arithmetic or computational abilities. (These are included as a separate descriptor category because although related to aptitudes and abilities they include significant knowledge and learning components)	
Cross Functional Skills: various types of generic skills related to performance of broad categories of work activity that tend to occur across relatively wide ranges of jobs, (e.g.) information gathering; oral communication; problem analysis; negotiating; organising and planning; co-ordinating with others and coaching or mentoring	
Occupation Specific Skills: developed ability to perform given general or specific work activities that tend to occur across relatively narrower ranges of jobs and/or defined in relatively or activity specific terms. These are operationally defined as the ability to perform generalised work activities and job duties/tasks or the ability to use or operate given machines, tools or equipment, (e.g.) ability to read blueprints; repair electrical appliances; to type, proof-read statistical reports, etc.	
Occupation Specific Knowledge: understanding or awareness of, or familiarity with the facts, principles, processes, methods or techniques related to a particular subject area, discipline, trade, science or art. It includes knowledge of foreign languages, computer programming languages and specific computer software packages or applications, (e.g.) financial planning and analysis; computer graphics; data communications networks; patent law; spreadsheet software	
B. Skills dimensions	
Content Skills: background structures needed to work with and acquire more specific skills in a variety of domains - reading comprehension; active listening; writing; speaking; -mathematics; -science	
Process Skills:procedures that contribute to the more rapid acquisition of knowledge and skills across a variety of domains: critical thinking; active learning; learning strategies monitoring	
Cross-Functional Skills required: (developed capacities that facilitate performance of activities that occur across jobs)	
Social Skills: developed capacities used to work with people to achieve goals: social perceptiveness; coordination; - persuasion - negotiation - instructing- service orientation	
Complex Problem Solving Skills: developed capacities used to solve novel, ill defined problems in complex real world settings - problem identification - information gathering - information organisation - synthesis/reorganisation- idea regeneration- idea evaluation- implementation planning- solution appraisal	
Technical Skills: developed capacities used to design, set up, operate and correct malfunctions involving applications of machines or technological systems - operations analysis- technology design- equipment selection- installation- programming- testing - operation monitoring- operation and control- product inspection- equipment maintenance- troubleshooting- repairing	
Systems Skills: developed capacities used to understand, monitor and improve socio-technical systems - visioning- systems perception- identifying downstream consequences - identification of key causes- judgement and decision making- systems evaluation	
Resource Management Skills: developed capacities used to allocate resources efficiently - time management- management of financial resources- management of material resources- management of personnel resources	

4. Conclusions and policy implications

SME Clusters as Learning organisations: theoretical issues. The nature of learning

For many years, understandings about learning were dominated by an essentially behaviourist, reductionist perspective that has its roots in the conditioning theory developed by Skinner and Watson, and which essentially defines learning as an adaptive response by an organism to a change in its environment.
Two main characteristics (or misconceptions) of this perspective need to be emphasised. The first misconception is that learning is a linear process, with an existing state (or statis), a stimulus that in turn provokes a response, and then a change that marks an irrevocable shift or transformation from the original state The second misconception is that, in relation to human behaviour, an understanding of learning has to start from the level of the individual , so that learning in a social context (groups, organisations or societies) can be understood as the aggregate of individual behaviours.

It could be argued that conventional models of organisational learning (and in some respects the SME cluster model explored by DELOS) still retain elements of these positions. At one level, organisational learning theory typically takes as its starting point an 'information processing' model or 'black box' conceptualisation of learning (Atkinson and Shiffren, 1968; Craik and Lockhart, 1972), in which learning outcomes are seen as the end-product of an 'input-process-output' sequence through which information is converted into knowledge and then action. Such information processing takes place with regard to pre-defined learning goals that embody a rationalised and desired end state, for example the attainment of competencies. In turn, organisational learning within the firm can be seen as a collective and purposive strategy to achieve the goals of the firm (for example maximising profits, expanding market coverage, acquiring new production techniques). Widening the spatial boundaries of organisational learning still further brings into play notions of industrial districts as learning organisations with common goals and shared agendas providing an underlying collaborative infrastructure to facilitate collective learning. At the societal level, the current preoccupation with notions of the 'Learning Society' revives functionalist perspectives of the 1950s and 60s, which equated learning with a perspective on socialisation that argued that individuals were bonded together through a social commitment to shared values.
The recent White Paper, 'Teaching and Learning: towards the learning Society' (COM95, 0590), for example, depicts new technologies as the engine through which social integration can be realised, in terms of the transformation of work; the impact of internationalisation, generating a more mobile labour market; and the impact of scientific knowledge, with its capacity to reduce the gap between the 'haves' and the 'have nots'. Similarly, the Community Action programme 'SOCRATES' recognises the importance of inculcating young learners in the implications of 'information society culture' not only in terms of giving them the basis for building up a repertoire of flexible skills, but also in relation to addressing problems of marginalisation

(CO93/07/08). Furthermore, in the context of these paradigms, the Learning Organisation is considered to be an ideal way in which enterprises can successfully adapt to new challenges. More significantly, it is argued (see, for example, the EUROTECNET programme, orchestrated through Task Force Human Resources) that SMEs are the 'poor relations' of corporate organisations who need to be transformed into Learning Organisations through promoting changes in the relationship between SMEs and training providers. Finally, at the broadest scale, it has been suggested that globalisation processes, through promoting standardisation and homogenisation of skills and competencies, serve to reinforce trans-national organisational learning.

However, it is now accepted that learning cannot simply be defined as a process that brings about changes in human capabilities, competencies and behaviours. Learning is instead considered to be a lifetime social process of ongoing development that is anchored in a socio-cultural context. In this sense it is a continous rather than a discrete process, and it includes not only formal and consciously structured learning but also informal and incidental learning that takes place experientially from situations in which learning is not directly intended. Thus even current learning theories that focus on cognitive representations and schemata, for example Rumelhart, and Bandura, or those that emphasise neurophysiological processes, like Panksemp and Gray, acknowledge the importance of context and socio-cultural factors in shaping how individuals learn. The idea of considering learning as essentially communicative processes rather than cognitive performance is largely due to the resurgence of interest in the work of Vygotsky. Like the cognitive social learning school exemplified by Bandura, Vygotsky asserts that social interaction underlies all psychological processes and functions, including learning, but the essential characteristic of Vygostky's approach is the use of socio-cultural 'forms of mediation' or representation as the main link between social interaction and individual intrapsychological processes. These forms of mediation are essentially psychological tools or 'amplifiers' that are developed artificially by humans - language being the most important example - and which enable external experiential data to be internalised within an individual's cognitive schema.

Recognition of learning as a process of communicative action requires new thinking about the nature of, and relationship between information, knowledge and behaviour, and the transmission and dissemination of knowledge within a social and organisational context, such as the firm or the community. Such new thinking, reflected for example in the work of Gibbons et al 1994; Wikstrom and Norman, 1994 positions knowledge as a dynamic human process, anchored in 'communities of interaction ' that contribute to the amplification and development of learning and the creation of new knowledge. Although the terms 'information' and 'knowledge' are frequently used interchangeably, there is a clear distinction between them. According to Malchup (1981), information is a flow of messages or meanings which might add to or restructure knowledge. Knowledge is created and organised in the flow of information that is anchored in the beliefs and commitment of its holder or holders. According to Nonaka (1994) three basic factors induce individual commitment: intention, individual autonomy and fluctuation. Intention is concerned with how

individuals make sense of their environment. Individual autonomy establishes a basis for self-organisation, giving individuals freedom to absorb new knowledge. Fluctuation refers to the interruption of an individual's habitual 'state of being', giving them an opportunity to reconsider their thinking and perspectives. Related to these concepts are notions of different types of knowledge. Polanyi (1966) makes a distinction between explicit knowledge, that can be transmitted in formal language and modes of representation, such as libraries, and tacit knowledge, that is deeply rooted in action, commitment and involvement in a specific context, and which is accumulated primarily through 'hands on' experience.

SME Clusters / Industrial districts as 'learning organisations': key concepts and hypotheses considered by DELOS

Drawing on these concepts, it is clear that understandings about collective learning within the organisational context of the firm or at the level of the 'industrial district' will need to consider the complex interactions though which tacit and explicit knowledge become actualised through commitment to a particular socio-cultural context. Some writers, for example Habermas (1992) have argued that the advent of the information society has generated tensions that are leading to the 'rationalisation of the communicative practice of everyday life'. As a consequence of increasing professionalisation, the distance between 'expert cultures' and 'communities' is growing fast, precipitating a corresponding cultural impoverishment of social relations, and the cutting off of cultural tradition in the face of the expanding formalisation of 'organised domains of action'. The role played by new communication technologies in this rationalisation process is highly significant as well as complex. Instantaneous global communication, as Giddens (1994) puts it, "tends to produce cultural diasporas", where globalizing influences 'evacuate out' local contexts of action. As a result, personal identify becomes highly reflexive, and everyday 'experiments with the self' become an intrinsic part of daily activities, utilising information coming from a variety of sources.

Giddens, perhaps more optimistically than Habermas, argues that the proliferation of social movements and self-help groups reflect the collectivisation of this heightened self-reflexivity in the face of instantaneous global communication - in other words self-help networks are forms of 'organisational learning'. Such movements have played a major role in retrieving power from 'experts' and in the lay retrieval of knowledge and expertise. However, membership of such groups, and the underlying advances in social reflexivity that have driven them, also signal complex changes in traditional notions of identity and community.

Such changes are a key issue for DELOS, because they affect the notion of 'territoriality', which lies at the heart of the concept of 'SME clusters'. As with the White Paper on the Learning Society, with its implicit vision of European cohesion, the White Papers on Competitiveness, and on the Information Society tend to

present a monolithic view of the global economy, where 'power blocs' represented by the US, the Pacific Rim and Europe, compete against each other for dominance.

However, it is clear from the literature and from the DELOS case studies that globalisation is not a uniform phenomenon but a heterogeneous process, of 'intersecting universal and local narratives' (King, 1991). Thus globalisation has been alternately described as a 'space of flows' (Castells, 1989) as completely borderless and uniform (Ohmae, 1990), as a 'necklace of localized production districts' (Storper, 1991) - the definition that perhaps comes closest to how DELOS has conceptualised clusters- and as the centralisation of economic power and control in a small number of global cities (Sassen, 1991).

Furthermore, although there is evidence to support the view of a continuing process of global and cultural integration, shaped by powerful transnational companies, producing the simultaneous production and consumption of the same products and images around the world (Chesnaux, 1992), the global economy 'continues to be constructed in and through territorially bounded communities' (Amin and Thrift, 1995).

However these local socio-economic and socio-cultural spaces have different levels and scales of representation: a metropolitan area with a distinctive identity; a rural industrial district in Italy, or indeed something as huge as Silicon Valley. Globalisation does not imply 'sameness' but, if anything, a heightened role for cultural and territorial diversity (Harvey, 1989), since firms, governments and other actors come to emphasise their 'local' attributes as an important element in deriving competitive advantage in global markets.

Moreover, the significance of local identity in globalisation does not necessarily mean that the 'local' itself constitutes 'sameness'. As Massey (1993) argues, places do not have single pre-given identities, but are constructed out of emerging multiple social relations, and should be seen as 'shared spaces ... riven with internal tensions and conflicts'. Similarly, research also shows that these tensions and conflicts apply at the level of the organisation. Both large and small firms should be seen in terms of loosely connected arrays rather than an organic whole. Decision-making frequently involves ad hoc decision-making and continual improvisation. And successful decision-making - in terms of acquiring, retaining and updating know-how, and harnessing it to competitive advantage, is primarily underpinned by local institution-building.

In summary, therefore, whilst emphasising the spatial or local dimension of clusters and networks, the DELOS fieldwork considers the notion of localities as part of, rather than separate from, globalisation processes; they are the product of local, nation-wide, and transnational influences. As Amin and Thrift (1995) have argued, the local economic network is best seen as a relational and relative concept, constituted in and through its relation to the global. They identify some of the non-economic reasons why place-

centredness appears to be of particular importance in integrated global production filieres, serving to overcome problems of integration and coordination. First, localised centres provide face to face contact needed to generate and disseminate discourses, collective beliefs, stories about what world production filieres are like. They are also points at which knowledge structures can be tapped into. Second, centres are needed to enable social and cultural interaction, that is, to act as places of sociability, of gathering information, establishing coalitions, monitoring and maintaining trust, and developing rules of behaviour. Third, centres are needed to develop, test and track innovations; to provide a critical mass of knowledgeable people and structures, and socio-institutional networks in order to identify new gaps in the market, new uses for and definitions of technology, and rapid responses to changes in demand pattern.

The social and cultural constituents of the economic

The DELOS field work also considers the idea that the economic is not a separate sphere which is then in some sense embedded in the social. Rather, the economy has to be considered as a set of institutions and institutionalising processes. All aspects of the process of institutionalisation need to be investigated, not just those that are conventionally labelled 'economic'. Thus in our in-depth assessment of how SME clusters operate, we examine the following factors in the learning process: structure (networks of interpersonal relationships); culture (different forms of shared understanding or collective consciousness); processes of cognition (different forms of rationality); and politics (the way in which economic institutions are shaped by the state, class forces, religion, etc.).

Networks as socially embedded

Following on from this notion of cultural contextualisation, DELOS considers how firms are embedded within socio-economic networks. We look at how important and how enduring are webs of relationships with customers, suppliers, family friends, and trade associations and thus competitive behaviour and strategic action (awareness) takes place in the framework of existing and established relationships. The main hypothesis examined in this sense is that competitive advantage is only really meaningful in the context of the networks within which firms are located.

However, we do not suggest that networks share all the same qualities. The literature suggests that they differ in the degree to which their members share the same backgrounds (class or gender or familial ties), institutional ties, and cultural and political outlooks. The spatial or territorial element of a cluster thus involves the bringing into play of locally sedimented, practice-based knowledge and experience, or the mobilisation of collective memory; it always produces a conjuncture of the local and the more global which is in some measure unique.

It is thus argued that formal institutional networks are more useful when socially constructed, that is emerging out of a myriad of experiences, folk views, values and shared norms that characterise and initialise a regional milieu. Synergy effects are expected from a common cultural, psychological and political background. In cases where these cohesive forces are not strong within an industrial area, then one tends to observe only a limited use of institutional networks (Aydalot and Keeble, 1988).

'Institutional thickness'

Amin and Thrift (1994) have introduced the term 'institutional thickness' to refer to the social and cultural factors that live at the heart of economic success. Institutions are very broadly conceived, to include not only formal organisations but also more informal conventions, habits and routines which are sustained over time and through space. The authors isolate the various factors that a contribute towards the construction of institutional thickness:

- strong institutional presence, that is the plethora of institutions of different kinds (including firms, financial institutions, local chambers of commerce, training agencies, trade associations, innovation centres, marketing boards, unions, development agencies) which can provide a basis for the growth of particular local practices and collective representations

- high levels of interaction among the institutions in a local area. The institutions involved must be actively engaged with and conscious of each other, displaying high levels of contact, co - operation and information interchange which may lead, in time, to a degree of mutual isomorphism. These contacts and interchanges are often embedded in shared rules, conventions and knowledge which serve to constitute the 'social atmosphere' of a particular region

- the development among participants in the set of institutions of a mutual awareness that they are involved in a common enterprise. This will almost certainly mean that there is a commonly held industrial agenda which the collection of institutions both depends upon and develops. This will usually be no more than a loosely defined script, although more formal agendas are possible. This agenda may be reinforced by other sources of identity, most especially various forms of socio-cultural identification (such as a region, gender and ethnicity).

We consider in DELOS the extent to which these determinants of institutional thickness will produce a set of outcomes that underpin economic success. The main factors considered are:

- institutional persistence (i.e. local institutions are reproduced)
- the construction and deepening of an archive of commonly held knowledge of both the formal and tacit kinds
- institutional flexibility (i.e. the ability of organisations in a region both to learn and change)
- the ability to extend trust and reciprocity
- the consolidation of a sense of inclusiveness (i.e. a widely held common project which serves to mobilise the region with speed and efficiency)

However, institutional thickness is not always considered to be a boon; it can also be a trap. 'Thickness', when expressive of a past economic trajectory, may be positively an obstacle towards the institutionalisation of new processes and structures appropriate for a different economic base. (See for example the study of the Swiss watch industry, Glasmeier, 1994.). It is by no means clear that the most successful regions will be the ones which have a tight-knit industrial structure, consisting of only a few closely defined institutional forms structured around a single industrial agenda. Grabher (1993) has argued 'in praise of waste'. That is, he suggests that the most successful networks over the longer run will be those which have considerable redundancy in their institutional structure. The institutional variety that networks in the form of industrial districts can offer, combined with their lack of any hegemonic institutional form, means that they constitute a constantly changing portfolio of possible organisational solutions to the problems of collective response to changed economic circumstances.

The cognitive dimension of networks

In addition to the social and cultural dimensions of economic activity elaborated above, there is a third intertwined cognitive dimension considered by DELOS. Sensemaking, as termed by Weick (1995) is a process entailing comprehending, constructing meaning, interacting in pursuit of mutual understanding and patterning. As a social activity, sensemaking is concerned with how interacting participants (or firms) evolve shared understandings around issues of common interest, and so develop a sense of the collective 'we'...that is, of themselves as distinct social units doing things together in ways appropriate to those shared understandings of the 'we'. Senge (1990) adopts a similar cognitive frame in his identification of shared 'mental models' as a key element in organisational behaviour and learning. Taking such a cognitive perspective, business competition can be analysed in terms of the mental models of decision-makers and how such mental models lead to a particular interpretation of the competitive milieu.

The cognitive dimension is increasingly recognised as important. Whilst it has proved relatively easy through the establishment of various new institutions to produce heightened levels of inter-institutional interaction, it has proved much more difficult to force a new collective representation of mutual awareness on these institutions, whether through coercive, nemetic or normative means.

Models of learning within the Firm

A key issue addressed by DELOS is the extent to which the types of understanding about individual learning discussed above can be extrapolated to the level of collective behaviour, and indeed whether the kinds of information gathering, knowledge acquisition and decision-making commonly carried out by SMEs properly constitute 'learning'.

In an intensive case study analysis of human resource development in UK SMEs, carried out by the Business School at Warwick University (Henry et al, 1991), two key aspects can be highlighted that are highly relevant for the kinds of issues and hypotheses outlined above that are examined by DELOS. The first aspect concerns the relationship between business strategy, skills development and learning. Essentially, the study suggests that, in practical terms organisational learning in SMEs focuses on two things: ***strategic positioning***, which is primarily concerned with building niche markets and network relations; and ***change and renewal***, which is typically a mixture of adaptation and developing markets, or responding to crises.

The second aspect is about the ***role of the entrepreneur*** (or equivalent dominant personality within the firm) in the above processes. The Warwick study demonstrates that the entrepreneur, or equivalent, is crucial both in terms of positioning the SME, and also in relation to both precipitating, and solving crises. The study concludes "in positioning, building and sustaining the SME, it is personal networks that count" and, furthermore, "any outside help has to recognise that the entrepreneur is the central figure, both in the achievements and problems of the SME". These conclusions also posit a key question: how is entrepreneurial knowledge passed on?

However, although the Warwick study accentuates the significance of single key decision-makers in contributing to the adaptation and evolution of SMEs, it also highlights the importance of strategic and structural factors in 'organisational learning'. Thus, although the case studies implemented in the study confirmed that individual learning processes, such as entrepreneurial 'learning by doing' and formal training undertaken by individual employees to acquire new skills, were instrumental factors in developing strategic positioning, change and renewal in SMEs, they were counter-pointed by what the study calls 'strategic

management'. Strategic management, in this context, is defined as an integral part of the broader 'human resource development' activities through which SMEs learn, and is seen as an organisational attribute that is embedded in the ways in which people work together. The study identified several examples of 'firm-specific training' and cross-job problem solving in the UK case studies that have previously been associated with Japanese models of organisational learning (Ishikawa, 1987). Finally, the study also showed how the particular features of strategic development in SMEs are shaped by factors such as:

- size of firm- which dictates, inter alia, the position of firms in particular market niches and the resources they can devote to training

- age and stage of development - which will reflect, for example, training needs in relation to acquiring critical mass; making the transition from small to medium size, or renewal strategies after a period of decline

- sector and market position - reflecting, for example, diversification or reliance on one dominant supplier, and the labour markets in which SMEs compete

- social networks, corresponding the issues around 'institutional thickness' discussed above in Section 2.

Conclusions from the DELOS research

Taking the theoretical positions discussed above and the more focused findings of the Warwick study on learning in SMEs outlined as benchmarks against which to assess the DELOS field work, below are presented our main findings on how SMEs 'learn'. These findings are primarily drawn from the DELOS 'baseline survey' of 323 SMEs from six European countries, supported by in-depth case studies of the behaviours of these firms within their 'industrial districts'. These data thus allow a more extensive cross-section of behaviours to be explored, as well as providing the opportunity to consider the effects of cultural differences between SMEs.

Structural features

As Figures 1 to 3 show, SMEs exhibit variable structural characteristics in terms of size, age and production characteristics. In keeping with the results of other studies, the DELOS results show a high concentration of micro-enterprises (60% employing less than 50 employees); a broad spread of age, with 18% old-established (pre 1950) and a similar proportion recently-established (post 1990), and three main categories of production type: standard product (40%); direct to customers (31%) and ordered by contractors (29%).

FIG 1: SIZE DISTRIBUTION

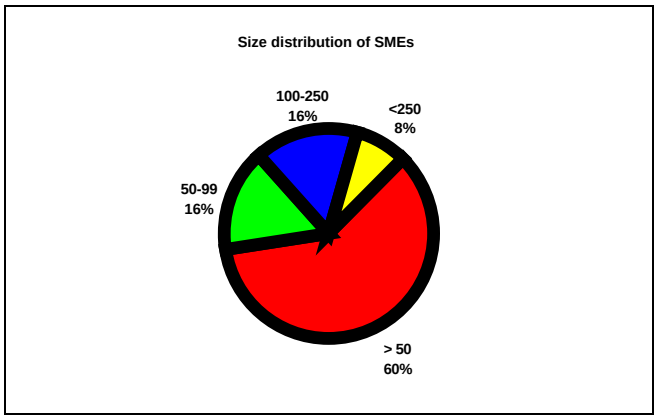


FIGURE 2: TYPE OF PRODUCTION

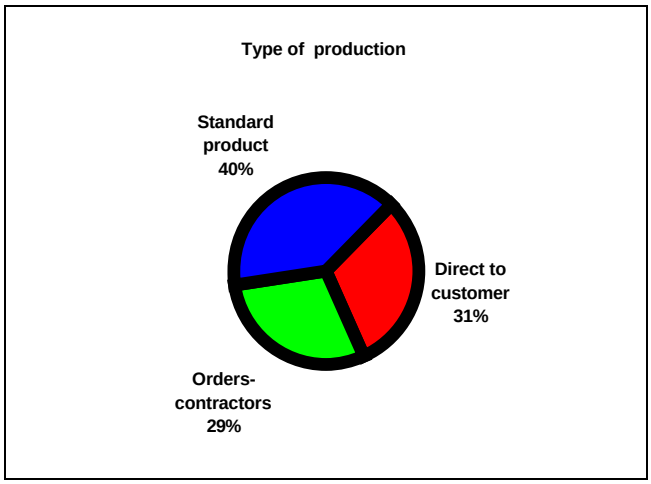
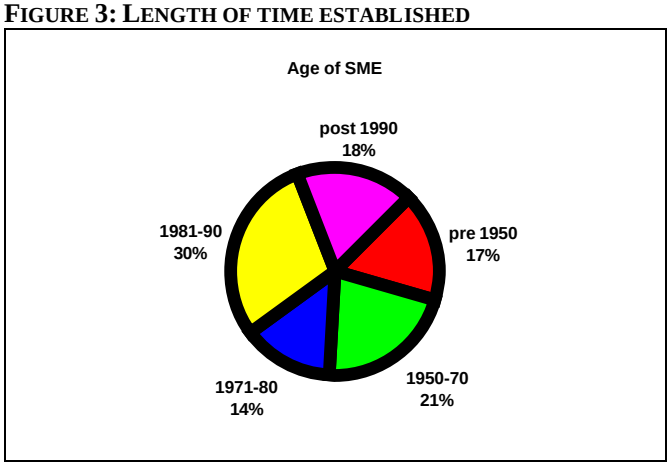


FIGURE 3: LENGTH OF TIME ESTABLISHED



In turn, the DELOS data on strategic positioning, adaptation and renewal strategies and the role of the entrepreneur in decision-making tend to reinforce to some extent the picture portrayed in the literature and in other studies (as discussed above inn the preceding sections). As Figure 4 shows, over 60% of the SMEs surveyed in DELOS reported that they typically collaborated with other firms within the local area, with only 40% of the sample in 'competitive' relationships. As Figure 5 shows, the DELOS field data also highlights the importance of the entrepreneur as a pivotal figure in the way SMEs make decisions, with over 55% classifying the decision-making style of the firm as 'entrepreneurial'. However, it should be emphasised that over 40% of firms engaged in 'participative' decision-making, for example in terms of cross-job problem-solving.

Figure 4: Relationships between SMEs

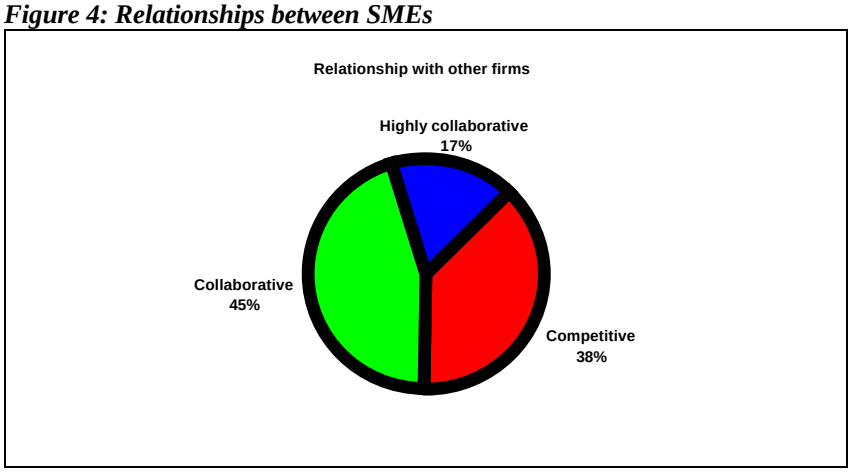
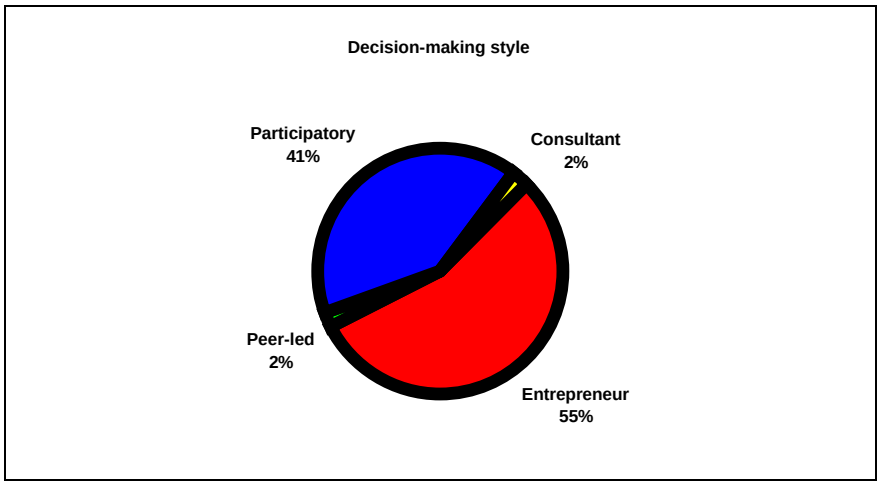


FIGURE 5: ROLE OF THE ENTREPRENEUR IN DECISION-MAKING



Looking in more detail at the factors shaping organisational learning in SMEs, the DELOS field work considered the relationship between learning components (the constituent elements with which SMEs construct learning behaviours, including information; external knowledge; market intelligence;

competencies) and learning processes (the activities through which these elements are constituted in terms of organisational learning, such as learning-by-doing; training and so on). On this basis, DELOS identified three main 'levels' of organisational learning:

- Information-gathering
- Knowledge acquisition
- Competence consolidation and development

These levels broadly reflect the strategic positioning, change and adaptation and strategic management forms of learning identified in the Warwick study. Information gathering can be conceived of as 'low level' data monitoring, acquisition and management, intended to ensure that the firm remains aware of changes and developments in the markets in which they operate. Knowledge acquisition can be defined as the process whereby firms define acquire the skills, know-how and strategic intelligence necessary to carry out day to day activities. Finally, competence consolidation and development can be seen as the process whereby existing information and knowledge is converted into 'learning', through, for example identifying skills deficits, acquiring new knowledge through training and collaboration.

All three levels encapsulate varying combinations of formal and informal learning activities. Thus, the DELOS field work suggested a classification framework of 'organisational learning' within European SMEs, set out below in Table 1.

In practice, the utilisation by SMEs of these forms of learning varies considerably. In the survey of SMEs carried out by DELOS, individual firms were scored on the extent to which they typically engaged in strategic and informal information gathering, and so on, in terms of their frequency of use of the sources shown in Table 1. Table 2 shows the distribution of scores for the three main and seven sub-elements of organisational learning identified by the DELOS field work (as set out in the classification framework in Table 1). Table 2 shows:

- SMEs appear to most actively involved in knowledge acquisition activities, i.e. acquiring and implementing the skills necessary to conduct day to day business activity. This type of organisational learning is primarily focused on using external sources, e.g. sending staff on training courses, but there is a significant component of collaborative interaction with other SMEs within the surrounding industrial district. Participative knowledge acquisition (e.g. cross-job problem solving within the firm) is much less significant than external or community-based learning.

- In contrast, both basic information-gathering (low-level monitoring of what is going on and opportunities within the industrial sector) and high-level competence consolidation (acquiring new skills; leading edge R&D and future-oriented innovation) are considerably less developed within SMEs.

- These findings would appear to reinforce the picture painted by other research studies of SMEs as crisis-driven and reactive, rather than pro-active learning organisations.

As a result, it is likely that SMEs on the whole lack expertise in a number of key competence areas, particularly 'core' skills and cross-job skills. This conclusion is supported by Figures 6 and 7, which show firstly the type of core skills identified amongst the DELOS sample, and secondly the needs analysis strategies used to identify information, knowledge and skills 'gaps' within the firm. The Figures show:

- Generic core skills among SMEs are concentrated in production activities, identified as the key skills area in almost half the firms surveyed. Skills in innovation and in marketing are less highly developed.
- Almost a quarter of the firms sampled did not carry out any form of auditing process to identify gaps in knowledge and competencies within the firm. Those that did tended to use informal methods of auditing, either in-house or by consulting with other firms in the area. Less than 10% of those sampled employed an outside consultant for skills auditing.

Table 1: Classification Framework for organisational learning in SMEs

Element	Sub-element	Key sources
INFORMATION-GATHERING	*Strategic*	Technical magazines Exhibitions and Fairs Data Banks Seminars and training sessions Government sources R&D Centres and Universities Buying in research
	Informal	Local Business Associations Chambers of Commerce Other firms Informal learning Clients
KNOWLEDGE ACQUISITION	*IN-FIRM*, adopting predominantly on-the-job-learning and mentoring inside the firm	mentoring on the job experience experts in the firm incorporation of new workers
	EXTERNAL, adopting more conventional and formal learning processes	Sending staff to training courses Mobility initiatives from outside
	COMMUNITY, predominantly drawing on expertise from within the local melieu	Mobility initiatives inside the industrial district Collaboration with other firms
COMPETENCE CONSOLIDATION & DEVELOPMENT	*Formal Learning*	Technical education Post graduate Specialisation Continuous training
	Informal learning	Family Mentorship On the job learning Informal relations with businesses

Table 2: Relative representation of forms of learning in SMEs.

Element	Low score %	Average score %	High score %	Top score %
INFORMATION GATHERING-strategic	42	33	19	6
INFORMATION GATHERING -Informal	28	38	25	9
KNOWLEDGE ACQUISITION- In-firm	0	3	59	38
KNOWLEDGE ACQUISITION- external	1	2	29	68
KNOWLEDGE ACQUISITION- Community	1	1	13	86
COMPETENCE CONSOLIDATION- Informal	32	35	14	19
COMPETENCE CONSOLIDATION- Formal	39	37	10	14

Figure 6: Key core skills in SMEs

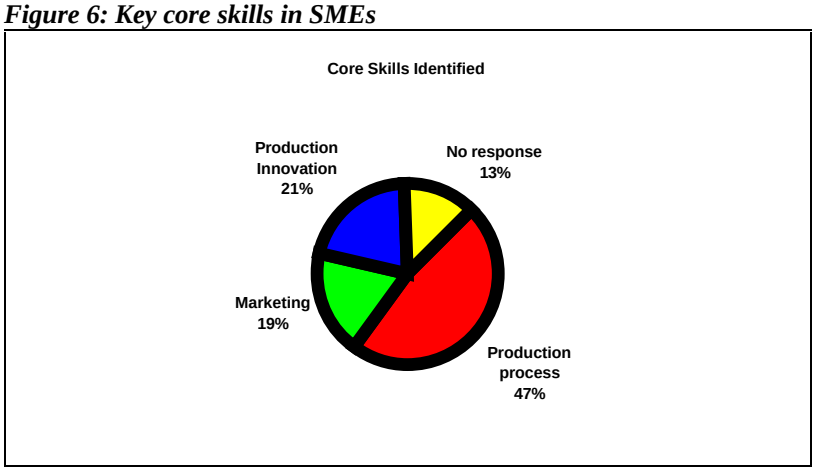
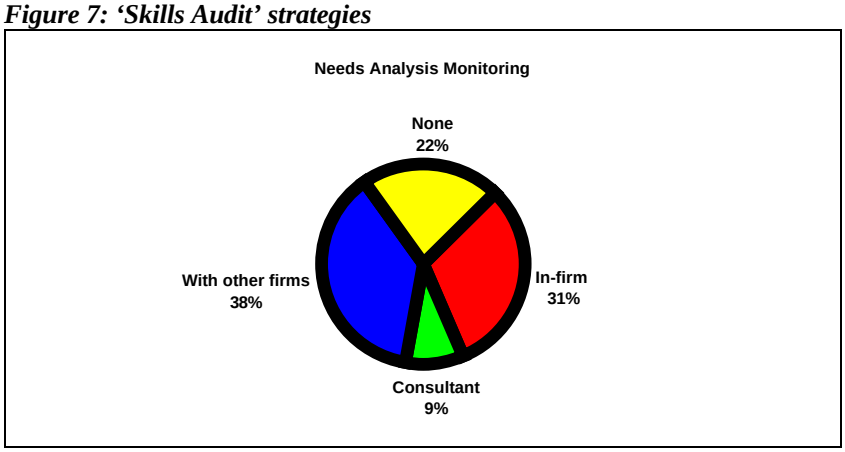


Figure 7: 'Skills Audit' strategies



An organisational learning model at the SME level

Drawing together the results of the DELOS field work, we conclude with an analysis of the dynamics of organisational learning within SMEs, with the intention of contributing towards developing a typology of organisational learning at the level of the SME. These conclusions are shaped primarily by multivariate analysis of the data derived from the baseline survey of SMEs carried out by DELOS. In summary, we looked at firstly the relationship between indicators of organisational learning and structural variables, such as SME size, length of time established, decision-making style and embededness within the industrial melieu (using chi-square and analysis of variance tests) and secondly at associations between the organisational learning variables themselves (using kruskall-wallis analysis of variance, spearman rank order correlation analysis and cluster analysis).

The main results of these analyses are as follows:
in terms of the relationship between the ***structural features*** of the SME and organisational learning strategies:

- size of firm is significantly related to strategic knowledge gathering and to the use of formalised ways of developing and consolidating competencies.. The larger the firm, the more likely it is to utilise strategic methods of information gathering, such as attendance at conferences; participation in trade fairs and buying in research. Micro enterprises, probably for reasons of cost, tend not to invest in formal training, such as technical education, whereas larger firms are significant users of training services.

- the age of the firm is significantly associated with variations in information gathering, knowledge acquisition and competence development. Generally speaking, the more recent the SME, the more likely it is to use informal ways of acquiring, utilising and storing knowledge, and of using on the job, mentoring and either in-house learning and training mechanisms.

- organisational learning is also shaped by the decision-making or leadership 'style' of the SME, and the degree to which it is embedded in local networks. Firms that are dominated by an entrepreneurial style of management tend to be significantly less likely to invest in external training for competence development. Similarly, the more 'embedded' the firm is within its local industrial district, and the more collaborative its relations and networks with other local firms, the less likely it is to invest in outside training.

- market positioning is also a factor in shaping the nature of organisational learning within SMEs. The evidence suggests that SMEs who form part of a larger organisational network (for example as a subsidiary of a larger company) are likely to draw on the resources of the parent or associated organisational to support their information-gathering activities.

In terms of the ***relationship between the different types of organisational learning*** identified:

- the analysis shows a high degree of colinearity between the three main types of organisational learning identified by the DELOS project. Thus firms who tend to rely on informal methods of information-gathering (such as contacts within the local Chamber of Commerce) are also more likely to expand and diffuse their knowledge base through tapping into and consolidating existing experience within the firm, and ultimately to approach competence development via mentoring and on-the-job learning. Conversely, SMEs that are more strategic in their information gathering (through using, for example, technical publications and external research) tend to have a similar strategic approach to knowledge acquisition and competence development, by, for example, sending staff to training courses and investing in continuing education development.

On this basis, we have identified a typology of organisational learning within SMEs. The typology, shown in the Table below, reflects how organisational learning within SMEs is shaped according to:

- the inter-relationship between information gathering, knowledge acquisition and competence development behaviours
- the relationship between the SME and its industrial melieu, and other structural characteristics, such as size, length of time established and decision-making 'style'

Type	**Info-gathering**	**Knowledge Acquisition**	**Competence development**	**Structural features**
crisis-driven	unsystematic	reactive	not prioritised	micro-enterprises new firms entrepreneurial disengaged from industrial melieu
endogenous	unsystematic	mentoring on the job experience buying in new workers	not prioritised	larger firms disengaged from industrial melieu
exogenous	unsystematic	externalised- mainly training courses	high level of formal learning-continuous training	opportunistic use of local networks
embedded-information centred	strategic: exhibitions; links with R&D centres	unsystematic	high level of informal learning: family mentorship; links with local firms	close links with local networks: highly embedded in industrial melieu
embedded - competence centred	informal: chambers of commerce; other firms	unsystematic	more formalised competence development	highly embedded; recently established

The DELOS field work suggests that there are five broad types of 'organisational learning behaviour' associated with European SMEs.

The first type, which might be described as ***'crisis-driven'*** in fact exhibits little evidence of organisational learning behaviour. Information-gathering practices, knowledge acquisition strategies and competence development appear to be either absent or rudimentary, and the firm typically responds to challenges and opportunities rather than pursues an active policy of human resource development and strategic management. This category shows a high representation of very small enterprises and new start-ups, whose decision-making strategies are typically shaped by a dominant personality - usually the entrepreneur. The evidence suggest that this type of firm constitutes the largest category of SMEs (around one third of the DELOS sample studied).

The second type of firm identified might be described as ***'endogenous***', because learning within the firm is focused on knowledge acquisition processes and behaviours, rather than information gathering or competence development, and these are derived from in-house practices rather than bought in from external sources, or supported by community networks. In this context, knowledge is acquired and utilised primarily through mentoring, on the job experience and 'head hunting' of appropriate qualified personnel.

In contrast, the third type of firm - the ***exogenous*** type- though operating outside the margins of its industrial melieu, is outward rather than inward looking and draws on external sources of expertise for developing its skills base. In this case, strategic management practices focus on systematic competence development on a continuing training basis and using specialised training providers.

The last two types of firm are highly ***embedded*** within the local industrial melieu, and use community-based networking for intelligence gathering, acquisition of new knowledge and consolidation and enhancement of skills. The distinguishing feature of the first type is the limited development of organisational learning. Strategic practices are largely confined to information-gathering, whereas higher level organisational learning - in competence consolidation and development - is rooted in the utilisation of community networks, family relationships and informal networking with other businesses. In contrast, learning behaviour in the second type is primarily focused on competence development using formalised practices and processes, for example technical education and specialised external training.

§§§

The **recommendations and policy implications** coming from of the DELOS project are shaped by the main over-arching conclusions suggested by the DELOS modelling exercises and are presented in form of 'Guiding Principles' aimed at enhancing the role played by the SME clusters in developing training and employment support for SMEs.
Since these principles need to be contextualised to the particular type of cluster in which they apply, the set of tools are intended to assess the type of cluster and make an audit of its strengths and weaknesses.

Principle 1:

There is no evidence that 'organisational learning', as reflected in collaboration between networks of SMEs sharing common geographical, cultural or operational spaces, is a universal phenomenon amongst European SMEs. Nor is there evidence that such 'aggregated learning' will in itself necessarily provide 'added value' for SMEs, in terms of outcomes such as human resource development, strategic market positioning and economic performance. Thus, training and logistical support policies and initiatives for SMEs need to be carefully targeted rather than generic, to take account of the varying structural features of SMEs, and the different types of learning behaviours they exhibit.

Possible actions:

I. Policy instruments developed by the European Commission, and member states to facilitate support for SMEs could be more tightly targeted to reflect the different configurations of 'cluster' and learning organisation described in this Deliverable. As an example, the Multiannual Programme for SMEs operationalises policies that aim to provide generic support in areas such as training and 'entrpreneurship'. However, the DELOS results suggest that training needs to be carefully targeted to the 'setting' in which SMEs operate, and that entrepreneurship can be an impediment as well as an asset to strategic decision-making and human resource development.

II. Training and labour market Observatories currently being developed through EU actions and initiatives, for example the LEONARDO Programme, could be used to capture, analyse and disseminate rich data on the number, characteristics and relative strenghts and weaknesses of European 'clusters'. These data could contribute to further development of the 'cluster typologies' developed through DELOS, and in the longer term to better targeting strategies for, for example, Structural Funds.

Principle 2:

Three main constituent components of 'organisational learning' need to be targeted in relation to training and support policies: information-gathering; knowledge acquisition and competence consolidation and development. These components imply different training and logistical support capabilities, and should incorporate both provision of 'formal' services, together with actions designed to enhance informal networking arrangements..

Possible actions:

I. Regional development agencies are in the best position to take a leading role in promoting formal information gathering actions. This implies the development of distributed databases containing data on conferences; exhibitions; developments in technical state of the art.

II. Informal information gathering support is naturally within the remit of SME institutions, such as local Chambers of Commerce, Local Business Associations etc.. Such networks would benefit from assistance to act as 'communication hubs' within a locale or cluster in order to facilitate better communication between local and their clients.

Principle 3:

By extension, SMEs need to be made aware of the need to balance these three different components in their human resource development planning and management. At present, SMEs are relatively active in knowledge acquisition activities, but not in lower-level market intelligence gathering or higher level competence development.

Possible actions

I. Awareness-raising campaigns, through policy instruments currently available to the European Commission and member states, aimed at encouraging small firms to consider these aspects of learning.

II. Incorporation of the three-stage model of 'organisational learning within the 'action lines' of Research Programmes and other actions implemented by the Commission.

III. Curriculum development and marketing policies of training support services by regional agencies and SME institutions, for example the UK TECs, to reflect the different components of learning.

Principle 4:

The entrepreneur is a pivotal figure in decision-making, but the evidence suggests that a large proportion of SMEs are in 'crisis management' rather than pro-active learning situations. Since entrepreneurial decision-making styles are closely associated with such crisis-management, there is a need to encourage SMEs to adopt a more participative style of collective learning.

Possible actions:

I. As with Principle 3, awareness-raising campaigns, through policy instruments currently available to the European Commission and member states aimed at encouraging entrepreneurs and key decision-makers in SMEs to consider 'alternative' forms of decision-making and human resources strategies.

II. SME organisations and local training providers to develop and run training support services aimed at providing key decision-makers with the management skills necessary to support strategic management and human resource development.

Principle 5:

Microenterprises and new start-ups are particularly prone to 'crisis-management', and the lack of a coherent organisational learning strategy. Since this situation is almost certainly associated with lack of resources, it would suggest the need for support services that can provide pooled resources for SMEs.

Possible actions:

I. At the European level, such services might take the form of Labour Market or Sectoral Monitoring observatories that are can provide resource services open to individual SMEs. These services could provide on-line information on, for example, local course available; key contacts; intelligence reports and links to on-line libraries.

II. At the local level, SME organisation networks and regional agencies could rpovide the focal point for local resource centres providing libraries, databases of training course and providers and similar facilities to European-wide support centres.

Principle 6:

There would appear to be significant gaps in the skills capabilities of European SMEs. Small firms tend to concentrate their efforts in developing and enhancing production-based skills, but there is a clear lack of competencies in marketing, and in cross-job skills that particularly needs to be addressed. SMEs appear to operate in general in highly localised rather than sectoral labour markets, which, as the DELOS field work confirms, means they tend to buy in new staff rather than train people. In turn, training appears to be geared to short-term and firm-specific objectives.

Possible actions:

I. Awareness-raising campaigns at European and member state level to encourage awareness of 'skills standards' issues, particularly in the area of cross-job competencies.

II. Incentives (in the form, for example, of training subsidies) through European Structural and Social Fund actions, and other Programmes to develop the training infrastructure to address these 'skills gaps' and to encourage SME employers and employees to develop their skills base. However, this does not imply that the skills and employment development of SMEs would be met by raising the general level of skills in the working population as a whole.

III. Regional agencies and SME organisations and training providers to target and market courses in these areas.

Principle 7:

Training and support policies for SMEs need to address the lack of expertise, and practices, in skills auditing amongst SMEs, their support organisations and regional development agencies.

Possible actions:

I. At European and member state level, policies and policy instruments to encourage the spread of a 'skills evaluation culture' and work towards providing the expertise and tools to support continuing skills evaluation by small firms.

II. Development of action lines in European RTD&D Programmes to precipitate advances in state of the art in skills standardisation frameworks and approaches; content models for skills capture and competence definition; skills auditing tools and methodologies.

III. Regional development agencies as part of their key objectives and tasks to carry out routine skills auditing and monitoring exercises within local clusters.

Principle 8:

The DELOS results reinforce the need for a ***European Skills Accreditation System***, as outlined in Objective 1 of the White Paper on Education and Training. However, such a system needs to be attuned to the particular features and needs of SMEs. It would therefore need to: capitalise on the extensive use of informal learning networks (on the job training; mentoring etc.) used by SMEs.

Possible actions:

I. Policy instruments at the European and member state level to encourage local clusters to act as the 'hub' of a European Accreditation system. This could imply incentives to develop local network centres (such as Chambers of Commerce) as central points for providing on-line assesSMEnt and accreditation to SMEs.

II. Encourage SME institutions to create awareness about the value of capturing on-the-job experience within SMEs; to provide competence standards that are contextualised to their local 'cluster' and to act as administrative and management foci for the accreditation of such 'informal' competence development.

5. DISSEMINATION AND/OR EXPLOITATION OF RESULTS

In order to build up an effective dissemination and exploitation plan, different target groups have been identified and segmented.

Regional and Local Authorities

Our main target group at meso level concerns the Regional and local dimension. Consequently, each partner of the Consortium is planning well contextualised dissemination and exploitation activities involving regional and local public authorities.

The objectives are, on one hand to discuss the general findings and results with the cluster representatives involved in the national reporting (which often acted as 'facilitator' in helping researchers to keep in touch with the key people to be interviewed during the field work) and , on the other hand, to test and disseminate the 'Cluster toolkit appraisal ' as showed in the final report.

The first meeting aimed at presenting the results of the project – at local level - was held in the Municipality of Mirandola in Italy (a little town in the Emilia Romagna Region, in which the Medical Device Cluster operates). The 18th of May 1998 took place the conference "*Il distretto biomedicale mirandolese. Politiche europee e regionali per rafforzare la competitività dei distretti a sostegno dello sviluppo locale*". Two representatives of the Istituto G. Tagliacarne were invited as speaker.
Other meetings are planned by ECWS/NL with the Plato management and by CCI Paris/F with management of the Reflex'oise cluster.

Networks
One of the most important dissemination channel will be constituted by the networks:

- Networks of CCIs at national and european level – the latter via Eurochambres , the European CCI association (in Italy, the Istituto G. Tagliacarne is a National Foundation set up by the Italian Union of the Chamber of Commerce and in France, the partner is the CCI of Paris).
- Networks of research centres, by means of the European Network for SMEs Research (comprising of 19 european partners representatives of 18 coutries) joined by the Istituto G. Tagliacarne
- The Italian Club dei Distretti (Disctrict Club) in which 3 out of 4 of the Italian cluster analysed are represented

Publications and research activities
Several partners due to their own institutional mission are actively involved in research activities focused on local development and SMEs clusters (InteReg/AT – Infyde/ES – Istituto G. Tagliacarne/I; the latter set up an annual report on this topic).
Other partners are mainly interested in the effect of the learning dynamic within SMEs and SMEs clusters (ECWS/NL - Tavistock Institute/UK – Formit/I).