

# **Developing Telematic-based Learning Services - the role of SME Networks**

A Study for the DGXIII C3  
Telematics Applications Programme  
Education and Training Sector



Commission of the European Communities  
Directorate-General for Telecommunications, Information Market  
and Exploitation of Research (DG XIII)

# **Developing Telematic-based Learning Services - the role of SME Networks**

Telematics Applications Programme  
Education and Training Sector

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## Executive Summary

### Purpose

This study has aimed to identify what are potentially the most effective ways of stimulating the development of *telematic-based learning services* amongst small and medium enterprises (SMEs) through the process of technology and innovation transfer along SME networks.

### Results

A database of 2114 entries has been created of which 1886 were surveyed with a questionnaire. There was a 19% response rate to the survey. The database has been used to provide supporting evidence for this study.

### Conclusions and Recommendations

#### *Types of SMEs*

- a.) SMEs should not be considered as a homogenous mass. Some SME sectors are likely to be more responsive to the utilisation of telematics -based learning than others.
- b.) A critical factor is identifying specialised networks rather than generic networks unless generic networks, are to the mutual benefit of the members.

#### *SMEs and Telematics*

- a.) There are encouraging signs that in some regions of the European Union, SMEs already have the equipment and are utilising telematic systems for some aspects of their daily work activities.
- b.) More detailed analysis and research is still needed in this area in order to get a clearer picture of the uptake of telematic systems amongst all sectors of SMEs and across all regions of the European Union. This is critical for the uptake of *telematic-based learning services*.
- c.) SMEs are more likely to consider the use of telematic learning services if they already have existing equipment and are using it within their daily work activities

#### *Development of telematic-based learning services*

- a.) Most SMEs will require training in the native language of their employees. Although some advanced professional updating could be conducted across Europe using English or French.
- b.) Language can cause problems in creating the economies of scale needed to develop multimedia telematic-based learning services. However, the eventual development of "tools" which enable the easy translation of materials into other languages may start to overcome this problem.
- c.) There are very few any good examples of telematic-based learning services specifically focused at SMEs. What does exist is generally at the project stage and has still to be proven to be sustainable in the market-place without subsidies. There is an urgent need to stimulate this type of development

### *Utilisation of Existing Networks*

a.) There are already many existing trans-European networks for SMEs, many of which were established with EU funds. These should be fully utilised to disseminate knowledge and know-how about the development of *telematics-based learning services*.

b.) It is strongly recommended that better use is made of these existing networks by raising awareness of the potential of *telematic-based learning services* through the organisation of workshop briefings and the establishment of an effective mechanism for dissemination of knowledge and know-how through these networks.

c.) The generic networks like Euro Info Centres, Innovation Relay Centres have a particular role to play in disseminating knowledge and know-how in telematic-based learning services but are not directly involved in being specific learning networks.

d.) Therefore there is a need to actively promote networks which actually are involved directly with SMEs in knowledge transfer.

e.) It is recommended that a more effective mechanism is established for feeding the National Awareness Partners with more information concerning developments in *telematics-based learning services* in order to better utilise their expertise for exploitation of results.

f.) It is recommended that Science Park managers are better informed about the potential for the development of telematic based learning services. Many skills and expertise that exist within the Science Parks are likely to be very useful for the development of components which could lead to the development of services.

g.) It is recommended that a European directory of consultants interested in the development of *telematic-based learning services* should be established. Through a mailing list and electronic mail they can be "fed" information in this field. A first stage could be to set up a workshop to bring together consultants from across Europe.

h.) Because of the high turnover rates of personnel in SMEs, encouraging the individual learner to remain associated with a training institution after taking a formal course to can encourage the development towards lifelong learning through the informal acquisition of knowledge.

### *Encouraging innovation transfer*

a.) The European Union's SPRINT Programme has ten years experience of stimulating the development of innovation and technology transfer. Although it may have had an impact on some companies including SMEs by encouraging them to be more aware and utilise more new technologies and processes within their core business, the techniques do not appear to have been used in the context to encouraging innovation within education and training.

b.) Encouraging the development of telematic-based learning services is clearly an innovation transfer process. There is an urgent need to look at existing techniques and test out "tools" which are already being used in other context within education and training.

c.) Innovation Networks in particular need to be made more aware of the potential for the development of *telematic-based learning services* as an economic growth sector.

Innovation networks themselves should also be making use of telematics systems as a means to disseminate information.

d.) It is recommended that a more effective mechanism is established for feeding the Innovation Relay Centres with more information concerning developments in *telematics-based learning services* in order to better utilise their expertise for exploitation of results.

e.) Other Member States should look closely at the UK Business Links example with a view to developing similar approaches in their own countries. As a pilot an effective mechanism should be devised and tested to ensure that Business Links, and in particular their Innovation and Technology Counsellors, are fully aware of the potential growth area in *telematic-based learning services*.

f.) There is a need to compile a databases of innovations (technologies and ideas) in the area of telematic-based learning which could be used by interested organisations

g.) There is a need to develop some innovation transfer diagnostic tools & methodologies to encourage the up-take of telematic-based learning services - target group training providers. A large body of knowledge and know-how is already available from other EU funded projects, and there is a need to fully utilise this expertise when developing strategies towards encouraging SMEs to utilise telematics based systems for training.

h.) It is strongly recommended that a similar scheme to Technology Performance Financing should be tried out, encouraging the use of a particular types of *telematic-based learning services*.

#### *Utilising mass media for training SMES*

a.) This study has not looked at the potential of mass media telecommunications systems like satellite and cable television. But, as new digital compression techniques start to become available and interactivity becomes a reality, there is a tremendous potential for producing cost effective training. Since over 90% of SMEs are micro companies employing less than 10 employees, mass production distance learning techniques may be the most appropriate method of reaching them. In fact it may be the only way of reaching large numbers of people working in SMEs

b.) Further research is needed to look at "mass media and mass production" techniques aimed at reaching large numbers of SMEs. This should also be framed around the fact that, often, the employer of an SME is unwilling to pay for training as they fear that once trained the employee will move to another job.

c.) There is a need to encourage a culture of "individual responsibility for learning" leading to lifelong learning. Mass media could be extremely effective in encouraging this cultural change.

#### *Dissemination of knowledge and know-how*

a.) Existing networks which already exist for SMEs should be better "fed" with information concerning the development of *telematic-based learning services* for all types of organisations including SMEs.

b.) There is a need to raise awareness that the development of *telematic-based learning services* not only can help to improve access to education and training, but that it can

also be a major creator of new jobs requiring a wide variety of skills and has a huge potential for exporting to a world-wide market.

c.) There is also the need to encourage the "training provider" (i.e. a university, further education college or other training organisation) to "hold on" to their clients by offering informal methods of knowledge transfer to keep them up to date with the broad developments in their specific sector. At certain points the SME will be able to "dip into" more formal courses as and when appropriate.

d.) The generic networks like Chambers of Commerce, EIC and TECs, Banks and Business Links should be made more aware of the potential of telematic based learning services through being fed information such as news releases which give real cases studies and which they can incorporate into their own publications. However, it is critical that the examples given are appropriate. Currently there are very few really good examples around.

e.) A conference should be organised that will bring together all this knowledge in order to stimulate new project proposals.

#### *Establishing Exemplar Projects*

a.) There is a need to establish more exemplar projects, particularly involving professional associations which will stimulate widespread adoption.

b.) It is highly recommended that professional associations across Europe are made more aware of the potential of *telematic-based learning services* and are encouraged to take part in pilot projects which promulgate these services among their members.

c.) A follow up study is needed to produce a directory of projects which are utilising various EU Funding mechanisms and to identify "examples of good practice".

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# 1. Introduction

## Purpose of the Study

This study has aimed to identify what are, potentially, the most effective ways of stimulating the development of *telematic-based learning services* among small and medium enterprises (SMEs) through the process of technology and innovation transfer along SME networks.

SMEs are important to the growth and economy of Europe. In order to stimulate their growth they need to adapt to change rapidly and make use of new technological developments as they emerge. This creates a need for continual updating of knowledge and know-how which could to be acquired through formal and informal training mechanisms. However, SMEs tend to be poor at "buying into" training, and traditional training providers have difficulty at meeting the needs of SMEs.

New technological developments, particularly those involving the use of telematic systems are starting to offer new ways of providing training which could be more appropriate to the needs of SMEs. This can involve providing training which is independent of location and time; making training available through open and distance learning; as well as adopting approaches like "just-in-time learning" and "learning-on-demand."

In the same way that companies need to adopt new ideas and technologies to gain a competitive edge over their rivals, the "services" which provide SMEs with this knowledge and know-how need to adopt new methods and technologies. The market for *telematics-based learning services* is still very immature and almost non-existent within the SME sector, but it is being perceived as a vehicle for SMEs to become better trained. Stimulating the development of *telematics-based learning services* involves the process of innovation transfer.

With around 15 million SMEs involving 68 million people within the European Union, the potential market for *telematics-based learning services* is very large. Potentially, this could also have a major impact on increasing the uptake of training almost SMEs thus having an overall effect of increasing the competitiveness of SMEs.

However, there are many complex issues which need to be addressed including the limited number of real sustainable examples of *telematics-based learning services* focused at SMEs. This study has aimed to identify the most effective ways of stimulating *telematics-based learning services* through innovation transfer along SME networks. The aim would be to encourage a multiplier-effect as *telematics-based learning services* become established. It has also highlighted some of the other issues which need to be addressed and possible ways forward.

The study has aimed to:-

- identify organisational networks (e.g. professional associations, Chambers of Commerce, training networks, trade associations, Business Links) within Europe

- identify whether they have any involvement in training in particular flexible and distance learning

identify their level of awareness of the utilisation of telematics-based training (e.g. the use of video-conferencing, electronic mail, access to learning resources from a remote database leading to "learning on demand" and "just-in-time learning"

identify the sources of funding which are available to SMEs for training purposes

develop strategies to help the European Commission decide how best to raise awareness and encourage the utilisation of telematics-based training.

Chapter Two defines the nature of SMEs and provides an overview of their importance in Europe. It also highlights the fact that SMEs consist of many different types of organisation and should not be considered as one homogenous mass. Chapter Three provides an overview of the training needs of SMEs Chapter Four. describes developments in telematic services and also describes some of the developments towards *telematics-based learning services*. Chapter Five aims to describe the process of innovation transfer within a SME training context. Chapter Six describes the types of SME networks and their role in the innovation transfer process. Chapter Seven describes the financial mechanisms to support training and Chapter Eight draws some overall conclusions and makes some future recommendations for policy makers.

The target group for this report includes:-

policy makers at European Commission, national and regional government level

producers and developers of telematics-based learning services

training providers (private sector and public including universities and colleges)

organisations offering information services to SMEs (Euro Info Centres, BC-NETs, Business Links, Training and Enterprise Councils, Chambers of Commerce)

## 2. The nature and importance of SMEs in Europe

This Chapter provides a definition for a SME and describes the structure and the size of the sector within the European Union with some indication of geographical variations. It provides an overview of developments and also highlights the importance of SME for job creation and the economy of Europe.

### Definition of SMEs

No formal definition exists for small and medium enterprises (SMEs). Therefore the definition used within "The European Observatory for SMEs"<sup>1</sup> has been adopted for this study.

Within the non-primary private sector - that is, all private enterprises except those in agriculture, hunting, forestry and fishing - SMEs are defined as enterprises employing less than 500 employees. Within the SME-sector, the following size-classes can be distinguished:

micro enterprises: less than 10 employees

small enterprises: between 10 and 99 employees, which can further be subdivided into 10-19, 20-49, and 50-99 employees

medium enterprises: between 100 and 499 employees (further subdivided into 100-249 and 250-499)

Non primary private enterprises employing 500 employees or more are regarded as large sized enterprises (LSEs)

### Size and Structure of the SME-Sector

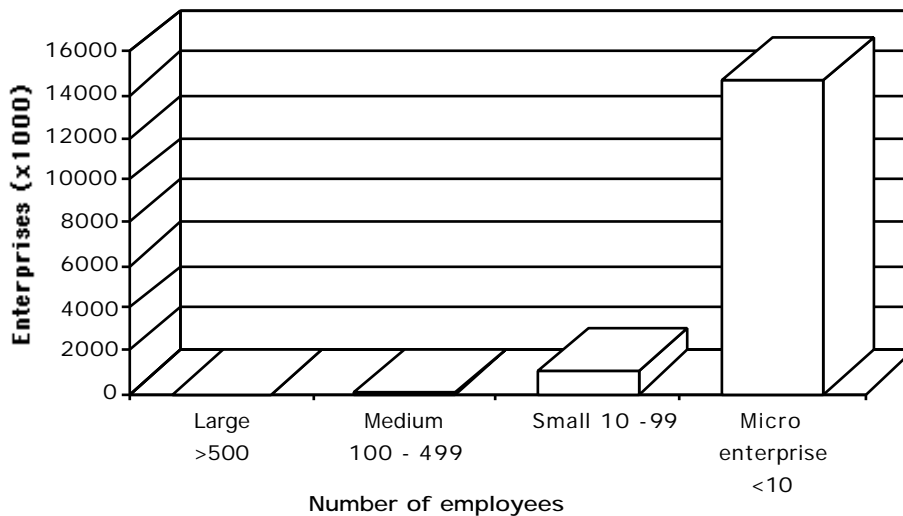
There were 15.8 million enterprises in 1990 in the non-primary private sector (i.e. excluding agriculture, hunting, farming and fishing).<sup>2</sup> The approximate figures are:-

13,000	large sized enterprises (LSEs) with more than 500 employees
70,000	medium-sized enterprises employed with between 100 and 500 employees
1,000,000	small enterprises with between 10 and 99 employees
14,700,000	micro-enterprises with less than 10 employees of which 50% of these have no salaried personnel

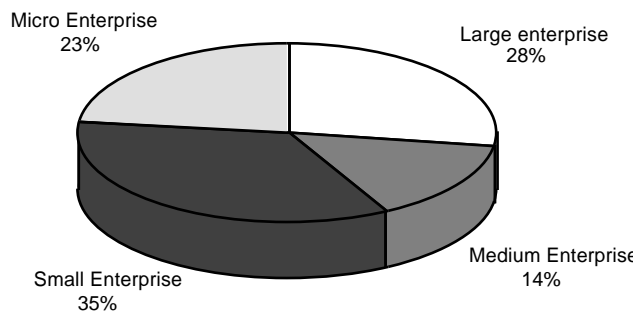
The average LSE has more than 2000 employees compared to the average SME who employs 4.3 persons including the entrepreneur

In the non-primary enterprise sector there were almost 95 million jobs. SMEs employed 68 million people (micro enterprises approx. 34 million and small approx. 22 million of this figure) which is almost 72% of total employment in non-primary enterprise.<sup>3</sup>

### Size and Structure of the SME sector



### Jobs in Non-primary enterprises As a percentage of the 95 Million Total



Labour costs per employee tend to be highest in the LSE - large enterprise dominated sectors, and lowest in the micro dominant sectors. The share of micro-enterprises in employment has increased between 1988 and 1990, at the cost of the employment shares of medium-sized and large enterprises.<sup>4</sup>

Although it is rather difficult to draw any conclusions on the implications of this for the development of telematic-based learning services, there are two trends which need to be noted. First, there is a trend towards small enterprises. This is likely to be due to "downsizing" of medium and larger enterprises and the creation of small and micro enterprises. This may also be a result of entrepreneurs, who were made redundant, establishing their own businesses. The implications for the utilisation of learning services are that enterprises are likely to be smaller, more dispersed and would have less traditional facilities or resources for training. Identifying these new enterprises, which probably have even greater training needs than well established SMEs, becomes more difficult than when there were larger and fewer enterprises.

Secondly, the "buying power" for learning services of smaller enterprises may be less than medium or larger enterprises as implied by the lower labour costs per employee compared to larger enterprises. Therefore traditional forms of training may be outside the "buying power" range of the micro and smaller enterprises. If telematic-based learning services can be developed which are cheaper than traditional training methods, this would fill a market "niche".

## Geographical variations

In the EU, the largest average enterprise sizes are found in Denmark, Germany, Luxembourg and the Netherlands. Average size is lowest in Greece, Italy, Portugal and Spain. In Greece and Italy, more than half of total employment is found in micro enterprises, while in the other countries, small and medium-sized enterprises, have the highest share in total employment at about 40 to 50%. Germany has the largest share of employment accounted by large enterprises. As yet, comparable figures are not readily available for the new members of the EU Austria, Sweden and Finland.

### Enterprises by Member State 1990

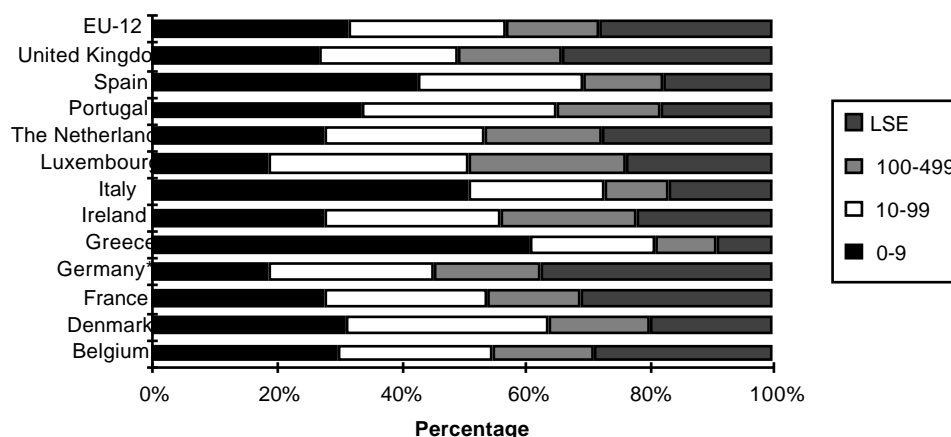
Country	Number of enterprises (1000)	Enterprises per 1000 inhabitants	Average enterprise size	Employment share SME				
				0-9	10-99	100-499	0-499	LSE
Belgium	490	49	6	30	25	16	71	29
Denmark	170	33	9	31	33	16	80	20
France	1,980	35	7	28	26	15	69	31
Germany*	2,290	37	9	19	27	17	63	38
Greece	690	69	3	61	20	10	91	9
Ireland	130	35	8	28	28	22	78	22
Italy	3,920	68	4	51	22	10	84	17
Luxembourg	15	41	10	19	32	25	76	24
The Netherlands	420	28	10	28	26	19	73	28
Portugal	600	59	5	34	31	17	82	18
Spain	2,460	63	4	43	27	13	82	18
United Kingdom	2,630	46	8	27	22	17	66	34
EU-12	15,780	49	6	32	25	15	72	28

\* Former FRG only

Source Eurostat/EIM<sup>5</sup>

In France, Germany and the United Kingdom, as well as in Denmark, Ireland, Luxembourg and the Netherlands, the number of enterprises per inhabitant is below the EU-12 average of 49 per 1000 inhabitants. In these countries, average enterprise size is also larger than the average of 6 for EU-12. The remaining countries - Belgium, Greece, Italy, Portugal and Spain - have a per capita number of enterprises which is above the EU-12 average, and average enterprise size which is at the same level or below.

EU employment by company size



Small firms, however, are much more important in the Southern Member States than in the North of the Community, though Denmark is an exception. In Spain, firms of

under 100 employees were responsible for 74% of private sector employment in 1991, in Italy, 69% and in Portugal, over 60%. In Belgium and Germany, however, they accounted for only 46% of the total and in the UK and Luxembourg, less than half.

There are several factors which explain differences between countries regarding average enterprise size. For example, there is a positive correlation between average enterprise size and per capita GDP. There might be several reasons for this:

- an increase in prosperity implies an increase in demand for goods and services, which make it possible for enterprises to exploit economies of scale. This eventually leads to higher average enterprise size.
- higher per capita GDP goes together with higher wage rates. This leads to concentration processes and higher benefits in large enterprises. This (partly) explains why e.g. in Denmark, France, Germany, Luxembourg and the Netherlands, enterprise size is above average.
- Stronger orientation towards international markets also contributes to concentration processes and the exploitation of economies of scale, and thus to higher average firm size. This might be important for Luxembourg.
- Average enterprise size is positively related to population density. Especially in consumer-related services such as - retail distribution, personal services - this influence might be significant. This is because customers have some critical distance beyond which they do not want to buy from a certain customer. This implies that suppliers will only serve customers within a certain range of their location. In this case, higher population density means that the number of potential customers will increase, thus leading to an increase in enterprise size. The Netherlands, having largest enterprise size as well as highest population density of all Member States, is an example of this.
- Country-size - as measured by GDP - is a factor . Enterprise in large countries have a large domestic market, giving rise to economies of scale. Principally, this plays a role for large enterprises. This phenomenon explains large average enterprise size in most large Member States.

Italy is more or less an exception to these rules. For this country, the low average enterprise size has to do with the regional distribution of prosperity, with low prosperity and strong SME-presence in the South, and high prosperity together with large average enterprise size in the northern part of the country.<sup>6</sup>

### **Importance of SMEs for the economy of Europe**

It is now recognised that small and medium enterprises have an important role to play within the economy of Europe. The European Commission's 1994 White Paper on "Competitiveness, Growth, Employment " recognises that SMEs play a crucial role in the link between growth and employment but considers that unless the confidence of SMEs in the prospects opened up by the single market is restored, an important potential for growth will go under exploited. "The Community must therefore devise a back-up strategy designed to make it easier for businesses, particularly SMEs, to adapt to the new requirements of competitiveness and thus ensure that economic operators are properly mobilised in support of growth, competitiveness and employment."<sup>7</sup> There is also concern that the rate of SME failures, which according to certain indicators

seems to be on the increase in most Member States. This is a worrying factor with regards to the maintenance and growth of total employment.<sup>8</sup>

SMEs provide more than two-thirds of Community employment and generate more than two thirds of Community turnover (70.3%) and between 65 and 85% of value-added in those countries for which data is available. They are considered to be the greatest potential job creators. In qualitative terms, SMEs play a major role in providing young people with their first job, thereby being instrumental in the training of the labour force. They also help to provide productive employment for the less sought-after categories of individuals on the labour market since they recruit disproportionately large numbers of young people, women and unskilled workers and operate wage and productivity structures of their own.<sup>9</sup>

"With regard to job creation, the important role of SMEs is frequently stressed. SMEs should therefore be supported through tax measures, EU-sponsored advice programmes, the sharing of "good practice" across Member States and through the use of EU services and networks."<sup>10</sup>

### **SME performance and job creation**

Indicators from various European countries suggest that smaller firms may have some inherent competitive advantages under the current economic situation. In Italy, for instance, firms with less than 100 employees provide for 6.5 % of employment, but 7.4% of GNP and 13.4% of exports. Research results for Great Britain show that job creation by small firms is less affected by economic cycles than that of large firms. Moreover, between 1979 and 1991, employment in small firms (with less than 100 employees) rose from 40 to 50% of the private sector labour force. In France and Spain as well, the smaller and medium-sized companies (up to 500 employees) have been the principal job creators during the '80s.<sup>11</sup>

There is evidence pointing to the increasing importance of micro and small enterprises. Micro and small enterprises increased their share in turnover, with losses for medium-sized and large enterprises. Medium-sized enterprises in particular faced a reduction in their share in turnover, rather than in employment.<sup>12</sup>

### **The different sectors of SMEs**

In all sectors, the vast majority of enterprises are SMEs. One way to classify sectors of industry is by using the concept of size-class dominance. A sector is said to be either micro, small, medium or large dominant. Mineral extraction is dominated by large enterprises, with 61% of employment in LSEs. Also transport and communication, and producer services are large scale dominant (56%). Producer Services are, strictly speaking, large scale dominant. However, in these sectors SMEs also have a significant employment share. Construction and Wholesale Trade are all micro and small dominant sectors. Retail distribution and personal services are classified as micro-dominant sectors, the employment share of micro enterprises being 58% and 49%, respectively, and the employment shares of each of the other size-classes is below average. These sectors are especially strongly oriented towards the general public; this appears from the fact that 50% of total output consists of consumer goods and services. This necessitates a small-scale distribution network, which explains the importance of micro enterprises in these sectors.<sup>13</sup>

Number of enterprises and employment by sector of industry, EU-12, 1990

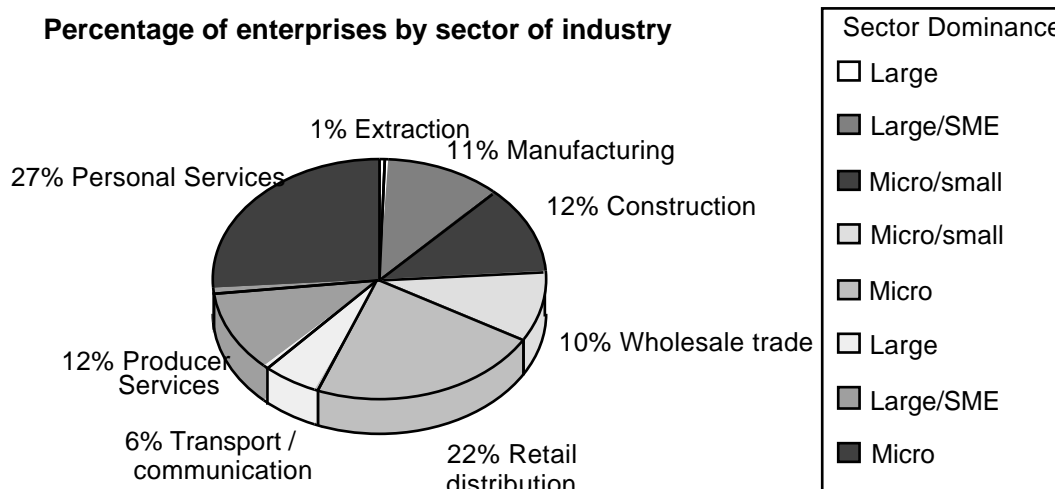
	Number of Enterprises	Micro 0-9	Small 10-99	Medium 100-499	LSE >500	Total employment	
	1,000	% share				Min.	Dominance
Extraction	150	7	17	15	61	4.3	large
Manufacturing	1,750	15	28	21	37	27.4	large/SME
Construction	1,890	44	34	11	10	8.8	micro/small
Wholesale trade	1,510	34	35	22	9	7.6	micro/small
Retail distribution	3,530	58	20	9	14	12.1	micro
Transport/communication	910	19	16	9	56	7.1	large
Producer Services	1,830	28	20	15	37	11.3	large/SME
Personal Services	4,210	49	23	13	15	15.8	micro
Total	15,780	32	25	15	28	94.6	

Source:  
EuroStat/EIM<sup>14</sup>

Small firms are much less important in the Community in manufacturing than in services. In 1991, under 40% of those employed in manufacturing worked in firms of under 100, as against 60% in the case of services. In Japan, though the same phenomenon is evident, small firms account for a higher proportion of employment in manufacturing than in the Community (providing 45% of jobs), reflecting the Prevalence of sub-contracting by large corporations. Similarly, in the South of the Community, small firms provide proportionally more jobs in manufacturing than in the North (60% in Italy and Spain as opposed to under a third in the UK and 28% in Germany)

In private sector services, over half of the employment was in firms of under 100 in all Member States, except Belgium (where the data exclude the self-employed), and in Spain and Italy, over 75%. Within services, small firms account for over half of jobs in the two main growth sectors - other services (mainly personal services in this case) and business services.<sup>15</sup>

**Percentage of enterprises by sector of industry**



**SMEs and Industrial Restructuring**

The purpose of this section of the document is to examine the technological and economical trends which have led to the current prominence of SMEs within the economy of the European Union. Although the flexibility of SMEs has enabled them to adapt and respond effectively to the changes of recent decades it is necessary to



reflect whether this will continue to be the case as the information society rapidly evolves.

While, in the recent past, SMEs have shown themselves to be adaptable to industrial change, future changes can be expected to be of a different order of magnitude. Effective response to changes in a learning society will require enterprises to function as learning organisations. Although SMEs, as inherently team based organisations, have been effective in harnessing experiential learning they have been less effective as open systems which utilise and contextualise externally derived learning inputs.

#### *From mass production to customisation*

The 20th Century has witnessed periods of profound and revolutionary change in industrial structures. The first of these revolutions, resulting in mass production techniques, was driven by the notion of economies of scale which led to ever increasing concentration of economic activity and employment in very large vertically integrated organisations.

The EU and its major industrial competitors now find themselves in the throws of the second revolutionary restructuring of industry this Century. The new industrial age is characterised by a shift back to much smaller units of production either as independent small and medium enterprises or as small autonomous or semi-autonomous units within larger organisations.

During the 50 or 60 - year heyday of the mass production era, small businesses continued to play their part in the economies of developed nations. While large firms tended to dominate stable and high volume markets the flexibility of small firms to cater for more specialised markets and to operate in less stable market conditions ensured their continuing importance.

As the role of small firms in the European economy began to grow from the 1960's the trend could be explained by increasing prosperity leading to a demand for more specialised luxury items and to a growth in the service sector where small firms tended to have certain advantages. During this period there was no obvious shift in the balance of comparative advantages between small and large organisations. Large organisations continued to enjoy the advantage of high level corporate expertise in areas such as finance, R&D, advertising and marketing. They also had access to capital necessary to help sustain their higher labour productivity. SMEs on the other hand, while lacking this expertise, did not carry the high corporate overheads necessary to sustain them but enjoyed the adaptability which short channels of communication tend to facilitate.

However, during the 1970's and 1980's the influence of technology was beginning to result in a movement to flexible specialisation<sup>16</sup>. Flexible specialisation has enabled the products of high volume producers to become less standardised and more precisely tailored to the needs of specific market segments without sacrificing efficiency. Comparable, flexible capital equipment available at prices affordable by certain SMEs permitted far greater efficiency in batch production processes meeting customised needs which had remained the preserve of the smaller enterprise even in the heyday of mass production.

The combination of market forces and technological change has therefore served to blur the distinctions between the manufacturing paradigm adopted by SMEs and the lean production paradigm increasingly used by larger organisations. Parallel influences deriving from quality management strategies with greater worker empowerment, more

emphasis on team work and more horizontal rather than vertical organisation structures and communication flows have provided a further impetus.

A recent study by the Club de Bruxelles<sup>17</sup> has also indicated that SMEs achieve twice as many innovations per employee and produce three and a half times as much innovative product per dollar invested in research as do large companies. However, the same study suggests that innovation is not a concern in nearly half of SMEs and that where innovation takes place it is mostly done internally in order to improve production or commercial practices. The same report also refers to the reluctance of SMEs to make use of external technological resources.

These findings suggest that SMEs are very proficient at using their existing, highly developed expertise related to current process and extrapolating from these to generate test and apply new and sometimes highly creative ideas.

However, in future, the rates of change and the extent to which change will involve information technology in *all* organisations can be expected to reduce comparative advantage of greater flexibility that SMEs have has over larger organisations. Therefore, it must not necessarily be assumed that previous successes by SMEs in innovation will continue in the information society. Future business success will increasingly depend on business ability to function as learning organisations. SMEs could be disadvantaged if they are reluctant to adopt new learning technologies and continue to rely too heavily on experiential learning from within the organisation.

### 3. Training and SMEs in Europe

#### Training in SMEs - the issues

Compared to large firms, SMEs have tended to give training a low priority<sup>18</sup> and have allocated little financial investment for this activity. In the UK, for example, only 1 in 12 workers in organisations employing fewer than 25 persons claim to have received training through their employer<sup>19</sup>. Whereas in Denmark, only 36% of micro enterprises have a specific budget compared to 76% for those with 250 or more employees<sup>20</sup>. Another recent study<sup>21</sup> identified reasons people operating small businesses in Australia fail to take up and/or complete training programs: these include unsuitable class times and courseware tailored to their immediate needs. Until recently, SMEs have tended to turn to the labour market for their supply of qualified staff and have tended to regard training as a privilege for managers or as a special reward for loyal workers, and one which is given only if the financial situation of the firm allows for this "luxury."

There are problems with small numbers of staff in reorganising workloads to cope with absences on courses and SMEs typically lack specialist HRD personnel to assist with skills audits, training needs analysis and learning action planning. They may face tighter financial constraints and feel constrained to take a short term view rather than investing in people development. Other characteristic problems which make it difficult for SMEs to establish adequate training measures include:

- SMEs lack the capacity to define their real training needs in the context of enterprise modernisation.
- SMEs normally lack the capacity within themselves to plan, organise and implement training and for many, it would be almost impossible to develop that capacity
- the external training market, provided by training institutions, does not meet the specific demands of a SME. The provision is of a general nature which requires too much time in a classroom situation, away from the job. To produce customised courses for a few employees is simply too expensive. Hence the justified complaint of SMEs is that the delivery of training by training institutions is of little or no use for their training needs.
- the tight financial margins within which SMEs operate and the small number of employees, make it very difficult to release employees to attend off-site training programmes."<sup>22</sup>

SMEs tend to not have their own training capacity. When they do train, they make more use of external training and place relatively more emphasis on induction training for new personnel. While comparisons are fraught with difficulties, there are marked differences remaining between the "initial" vocational education and training systems used by people entering the world of work across the Member States. Though less well documented, "continuing" training of adults national systems are if anything even more diverse. Europe's SMEs must thus contend with a wide range of training arrangements.

Nevertheless, basic economics predict that all enterprises are reluctant to invest their own resources in training employees in skills of use to other employers, but SMEs face

particular problems because they experience higher labour turnover rates and so have greater difficulty in retraining any skills created within the enterprise. However, there are some indications that non-market forces like legal requirements and "peer" group pressure have placed effective floors under training activity among SMEs, for instance in Germany's long established "dual" apprentice training regime."<sup>23</sup>

Existing training institutions have enormous problems selling their services and products to SMEs because it is claimed that the training delivered by external training institutions does not meet their real needs. SMEs represent, therefore, a potential market which is, as yet, untapped. This market cannot, however, be opened without radical changes in the relationship between the training provider and the SME."<sup>24</sup>

If they are to move towards integrated learning and working, they will require a high level of external professional assistance. Experts within SMEs may have few, or even no, colleagues with a similar or closely related specialism. In such circumstances they are, at least partially, deprived of the intellectual stimulus diversity of external contacts and other advantages of functioning within a team of specialists. The majority of SMEs will also have little or no internal R&D activity to help expand their experts' horizons and apply new knowledge to the context of their day to day operations.

Although there will remain many market niches where small, low overhead operations will continue to have a competitive advantage, thriving in the faster changing environment of the next twenty years may become more difficult for SMEs. In the short and perhaps medium term the trend, as large organisations flatten their organisational structure and down size, this is likely to result in more sub-contract work for SMEs. However, the UK Engineering Council report<sup>25</sup> which has identified this trend also drew attention to reductions in the supply of both trainers and trained employees moving from large to small companies and a lack of attention to the training of sub-contractor staff by large organisations.

A further study<sup>26</sup> suggests that SMEs in the UK engineering sector are among the organisations most hard hit by the re-emergence of skills shortages at time when the UK has unemployment still close to 3 million. 42% of SMEs across a range of sectors reported the re-emergence of skills shortages within their companies and 58% reported recruitment problems. The skills deficit embraced all levels of staff; managerial, professional, technical and craft but it was most acute among technical staff.

### **Training and SMEs - the concerns**

A report presented to the Council and European Parliament in 1992 concerning higher education considered that "... as the Year 2000 approaches, it is abundantly clear that the competitiveness of European industry depends on the capacity of the education and training systems in the Member States to produce and review all adequate stock and structure of qualified people. Given the nature of the technological skills needed by the emerging economy, and their fast rate of change, there is no way in which enterprises - either individually or collectively - can meet the challenge through their own efforts. Moreover, to compete means to innovate, the key to which is access to knowledge and skills as markets emerge. The networks to mobilise such resources as part of enterprise strategies cannot be mustered overnight. They have to be organically developed over considerable periods of time between the knowledge producers and the knowledge users. They are now part and parcel of the ongoing capacity to innovate, involving mobile but nevertheless permanent links between industry and higher education."<sup>27</sup>

Referring specifically to the education and training requirements of SMEs it stated that they "face many hurdles in gaining access to education and training. On average, their staff is lower skilled and managers often have no higher education degrees. Their access to new knowledge and technology is typically more difficult than with big companies. Moreover, they spend far less resources on continuous education and training. At the same time, education systems (in particular universities) are often not geared towards the recruitment profiles of the smaller companies. Nevertheless, the qualifications of their workforce are vital for European competitiveness."

The Commission white paper in 1994 stated that "particular attention should be paid to the continuing training of staff in SMEs, which account for a significant proportion of businesses in the Community and represent a potential for innovation which is by no means negligible. There can be no doubt that regional and local authorities have a particular role to play in this area by setting up mechanisms for promoting local forms of partnership in the area of continuing training and retraining of workers"<sup>28</sup>. It also stated that in raising the stock of human capital universities and other education institutions should be encouraged to collaborate more intensively with industry and commerce, especially with a view to ensuring the transfer of innovation and technological breakthroughs through continuing training schemes to firms, especially small and medium-sized<sup>29</sup>.

The Bangemann report also sees the promotion of distance learning centres providing courseware, training and tuition services tailored for SMEs as well as large companies and public administrations<sup>30</sup>.

#### **Application Two**

#### **DISTANCE LEARNING**

#### **Life long learning for a changing society**

#### **What should be done?**

Promote distance learning centres providing courseware, training and tuition services tailored for SMEs, large companies and public administrations. Extend advanced distance learning techniques into schools and colleges.

#### **Who will do it?**

Given the required network tariffs at competitive prices, industry will set up new service provider companies to supply distance learning services for vocational training. European Commission should support quality standards for programmes and courses and help create a favourable environment. Private sector providers and public authorities will enter the distance education market, offering networked and CD-I and CD-ROM interactive disk based programming and content at affordable prices.

#### **Who gains?**

Industry (specially SMEs) and public administrations, by cost reductions and optimisation of the use of scarce training and education resources. Employees needing to upgrade their skills by taking advantage of lifelong learning programmes. People tied to the home and in remote locations. Students accessing higher quality teaching.

#### **Issues to Watch?**

Need to engage in a major effort to train the trainers and expand computer literacy among the teaching profession.

#### **What target?**

Pilot projects in at least 5 countries by 1995. Distance learning in use by 10% of SMEs and public administrations by 1996. Awareness campaigns among the professional associations and education authorities.

The IRDAC report<sup>31</sup> sees a need to address the following points:

- Further research on the most appropriate learning methods for SMEs, the conditions for cost-effectiveness of continuing education and training (CET) for smaller companies, and the training requirements of SME managers (notably on

the link between business objectives and training). Strong incentives by government should be available for the take-up of CET by SMEs, as well as innovation and continuous improvement.

- Encouragement by public authorities of training co-operation models for SMEs. This should be done, first, with other SMEs, assisted where appropriate by intermediary organisations such as professional associations, chambers of commerce, and the UETP consortia created under the EU COMETT Programme; secondly, by providing access to training resources of larger companies with which they do business; and thirdly, by intensifying links with education institutions. The subjects taught in general and vocational education must reflect the fact that a large number of people will eventually be employed by SMEs. Organisation of apprenticeships and student placements should be stimulated as a means of bringing SME needs and initial education provision closer.
- Support for SMEs in the implementation of quality management approaches (through financial incentives by government and assistance by professional organisations). There is also a need to reconsider how quality certification can become more appropriate and less costly to SMEs. Prime contractors should be stimulated to include personnel development as part of the quality assurance programmes of their suppliers

Establishing closer links between industry and education is a key issue emerging from many reports. Another European Commission report <sup>32</sup> calls for an "improvement of the employability of people, with the active participation of industry and the social partners, by promoting investment in vocational education and training policies, combining practical training and work experience and offering qualifications closer to market needs. Access to life-long learning and training and to training in new technologies should be generalised."

The Higher Education report <sup>33</sup> states that industry, higher education and governments are co-operating to strengthen higher education-industry relations, with three objectives in mind:

- faster industrial application of the results of fundamental research
- improved output of technical skills
- more effective transfer of technology between sectors and regions."

However, it is considered that "the achievement of successful higher education-industry relations is totally dependent on the capacities and attitudes of the personnel concerned." There are efforts underway in both industry and higher education to effect a cultural change which will encourage and support co-operation. But, this cultural change must remain firmly grounded in the awareness of the respective characteristics of higher education and industry, with a necessary balance between "science push" and "market pull".

However, there is also concern that the SME sector, whose presumed capability to be flexible and responsive is central to their importance to the European economy, may in fact be deficient in this respect. It is also possible that this weakness, more critical with each year that passes, could become endemic while its longer term consequences are masked by a transference of work from large to small organisations.

The European Union has also set targets training expenditure and requirements:-

- Public expenditure on education: 5.5% of the GDP of the European Union, of which 20% for third level.
- In-company training: the aim is to reach 2% to 4% of salary expenditure (currently 1.5%). The number of training days required to maintain the qualification of employees is estimated at 600 million (based on 5 training days per year and per employee).
- Total expenditure for education, initial and ongoing training: 500 billion ecus.
- Technology-assisted training: 1.5% (of 500 billion ecus per year between now and the year 2000).
- Rapid growth in use of technology (25% to 30% per year), or expenditure of approximately 30 billion ecus per year between now and the year 2000.
- Training of unemployed people: 1 billion training days for an objective of at least 3 months' training per unemployed person.<sup>34</sup>

### **Open and distance learning within SMEs**

While SMEs may not have wholeheartedly embraced training, they are less embedded to a training paradigm partly as a direct consequence of their low training uptake and partly as a consequence of the traditional models of learning embedded within their organisations. Logically SMEs would appear to provide fertile ground for the uptake of forms of open/distance learning and telematics facilitated learning. Such approaches appear to resolve difficulties that SMEs typically face in being able to release staff without significant difficulties in maintaining output. The flexibility of delivery offers the opportunity to integrate the learning very closely with workplace activities and priorities and to make constructive use of mentoring by colleagues to help generate business benefits from the learning activity.

The 1994 IRDAC Report saw a perceived lack of relevance as a disincentive to SME participation in training. But, it considered that the enhancement of current open and distance learning practice through increased use of multimedia telematics offers new potentials to focus learning on specific business development opportunities.

An example of such an approach using existing technology was the EUROFORM Project BICOL (Business Improvement through Competence based Open Learning). This project involving a consortium from UK, France, and Ireland used a business improvement objective as the focus of learning activity. The inherent flexibility of modular open learning programmes enables the learning to be focused in this way. The BICOL programme generated some examples of business improvements through learning which produced measurable financial benefits to participating SMEs. The financial contributions ranged from projected savings of around 13 ECUs per annum through to projective savings in excess of 18,000 ECUs per annum. The potential for telematics to address a range of factors which have tended to inhibit SME participation in training could be extremely important to European competitiveness.

The Higher Education report<sup>35</sup> considered that expertise in open and distance learning as well as the potential benefits of open and distance learning is a common factor which links higher education and industry. This is especially so in relation to continuing



education and training. To that extent, the report stated that joint training projects present great opportunities to assist in strategic areas such as:

- the widening of access to higher education in Europe
- the promotion of distance and open learning for the recurrent and continuing training of the workforce (in particular SMEs)
- the promotion and introduction of new, notably computer-based, learning technologies.

### **SMEs as Learning Organisations**

Although SMEs appear to face certain disadvantages both in the overall volume of learning which takes place and in their ability to adopt a systematic approach towards the acquisitions of knowledge from external sources the process by which learning does take place within SMEs is much more consistent with learning organisation model. Such learning as does take place within SMEs tends to be of an active experiential variety involving the use of mentors closely focused on the needs of the business. Large businesses seeking to function as learning organisations are typically finding it necessary to consciously plan a shift away from a training paradigm towards a learning paradigm.

A key goal of a learning organisation<sup>36</sup> should be to create a cumulative competence within the organisation which exceeds the minimum requirement for current tasks, in order to build in the flexibility necessary to respond to change. However, often due to the very nature and culture within which the SME entrepreneur or micro enterprise owner/manager operates there is a strong leaning towards independence - going it alone or attempting to work in isolation with the minimum of outside help, support, advice and contact. While independence, tenacity and a strong, single-minded approach are essential elements of modern business survival, these can also work against innovation and instead foster a closed mind and a refusal to reach beyond day-to-day priorities.

### **Future Developments**

#### *Challenge for training institutions to provide new kinds of services*

One way to create an effective qualifications pool of qualified workers would be to transform this procedure of qualification needs analysis into regular meetings of experts from all levels of the enterprise, and external experts from the training institutions. Planning groups for further training could be the tool to transform the analysis of qualification needs into a permanent process of organisational development and, at the same time, ensure a long term co-operation between the enterprise and the training institute.<sup>37</sup>

The development of training concepts, methods and materials normally has to be undertaken by the professionals of the training institution. However, the integration of working and learning, of management and training initiatives, and the fusion of "job specific" skills with key qualifications, requires continuous co-operation and communication between the professionals of the training institutions and the enterprises. The many tasks concerning workplace transformation, project development, multiplier training, etc. need this constant interaction, as well as new competencies from the training institutions. Contents, methods and organisation of training have to be combined to create new ways of delivery that are effective and affordable."<sup>38</sup> However, getting the co-operation of SMEs in the first instance may require some "pump-priming" funding in order to prove the validity of this approach to SMEs.



### *Training institutions as "Total-Service Centres"*

The marketing strategy of training institutions in relation to "the integration of the external factor", needs a long term perspective requiring new ideas and approaches. One university in Belgium is actively trying to "hold on to" and cater for the lifelong learning needs of its graduate students by offering professional updating courses through telematic-based distance learning. The notion of consortia involving several training institutions and enterprises is worth exploring particularly if they could be linked by telematic systems that are also able to cope with a mobile workforce. The new strategies to be implemented will have an effect on how the training institution is organised and in the type of competencies required by the staff. In particular training institutions will have to develop new consulting competencies.

The central point which is emerging is that the model of the training institution of the future is one whose staff are working in and with the local SMEs, assisting them to become work-based centres of learning - learning organisations."<sup>39</sup>

### *Life-long learning*

"Life-long learning and access to continuing training for all should be more widely promoted. Telematic systems could be used to aid this development. The competitiveness of the workforce should be enhanced, by giving greater priority to investment in human capital in the context of the general policy to support investment, and by encouraging firms to build training into their company business planning with the active involvement of the social partners, including through collective bargaining. Priority should be accorded to increasing participation in training for those working in SMEs, including their managers, unskilled workers and those whose job is at risk. Access to training should be actively promoted in combination with part-time work. Investment in people should receive tax treatment no less favourable than given to physical capital investment and consideration should be given to the provision of tax incentives for individuals and firms to invest in their own training."<sup>40</sup>

Training methods and provision should be diversified, in particular through: the use of new technology, and the dissemination and use of innovative approaches and good practice developed through transnational training partnerships and networks; the development of quality standards for training supply and for the training of trainers; the development of varied routes to acquiring qualifications, for example through the recognition of prior learning and work experience or credit accumulation; more effective linking of R&D programmes with training provision including distance learning, with particular reference to the potential exploitation in SMEs."<sup>41</sup>

An recent article looking at new ways to learning <sup>42</sup>, stated that teachers must change from omniscient leaders to "tour guides of the infosphere." Changes foreseen include:

- From the standard classroom lecture to individual exploration, with networked PC's and access to information.
- From passive absorption on the part of the student to apprenticeship, requiring skills development and simulations.
- From individual student work to team learning, benefiting from collaborative tools and electronic mail.
- From the omniscient teacher to the teacher playing the role of guide, providing access to experts and information.

- From stable content of learning materials to fast-changing content, requiring the use of networks and publishing tools.
- From homogeneity of students and their needs to diversity and a variety of access tools and methods.

## 4. Developments in telematic services.

### Telematics and SMEs - a driving force

The Bangemann Report<sup>43</sup> clearly indicates that there is a need to stimulate the develop of telematic services amongst SMEs.

#### **Application Four**

#### **TELEMATIC SERVICES FOR SMEs**

#### **Relaunching a main engine for growth and employment in Europe**

#### **What should be done?**

Promote the widest possible use of telematic services (E-mail, file transfer, EDI, video conferencing, distance learning, etc.) by European SMEs, with links to public authorities, trade associations, customers and suppliers. Raise the awareness of added value services, and communications in general, among SMEs. Increase access to trans-European data networks.

#### **Who will do it?**

If the necessary ISDN networks are available at competitive rates, the private sector will provide trans-European value-added services tailored for SMEs. Local government, Chambers of Commerce and trades associations linking SMEs will mount programmes for integrating information networks at the local and regional level, promoting awareness campaigns for the services available.

#### **Who gains?**

SMEs will be able to compete on a more equal basis with larger companies and captive contractor-supplier relationships will be weakened. They will be more competitive, will grow faster and create more jobs. Relationships with administrations will be simpler and more productive. The category will gain in public standing and influence.

#### **What target?**

Access to Trans-European telematic services for SMEs available by end 1994-1995. 40% of SMEs (firms with more than 50 employees) using telematic networks by 1996. SME links with administration networks prioritised.<sup>44</sup>

### Use of Telematics by SMEs

A European Commission Study on Generic Services<sup>45</sup> considers that an interesting growth segment is for the 1-10 employees type SMEs, since:

- very few of them are currently (in Europe) making extensive use of any on-line services at all - therefore the potential is high if they can be educated about the business benefits of so doing.
- the "knowledge-intensive" subset of these companies could achieve a very high degree of "force multiplication" by accessing information-sources and bodies-of-expertise that cater to their particular sector or interest.
- the media (TV, radio and the Press) are increasingly featuring articles and news about the on-line services - the term "Internet", for example, has entered the general public's consciousness, even if they do not make use of it yet."

The study also predicts that by 1996 the new generation of operating systems with object-oriented network awareness will be dominant enabling the electronic network like the Internet to be hidden from the user who will just make use of its services from user applications like spreadsheets and word processing tools. The report considers that this has profound implications for the ways in which SMEs and other business

users can make use of the information "on the net" it is a profound change in the way that computers are used, and in turn will lead to what is called a "paradigm" shift in the application of computing technologies.

According to a survey of small businesses (companies with fewer than 100 employees) in the US by the National Federation of Independent Businesses, fewer than 50% have modems, 30% do not have fax machines, fewer than 10% use voicemail, and fewer than 20% use beepers. Small businesses account for 98% of all .US businesses.<sup>46</sup> A study<sup>47</sup> of information technology of small firms in UK manufacturing, retail/distribution and business services found the following:

- Telephone lines - even in the 1-4 employee size band, well over 80% of small firms have two or more telephone lines. Multiple lines are necessary not only as the business grows, but also to provide for fax and data communications.
- Availability of IT equipment - Fax is now almost universal and available for 94% of respondents. Some 85% have computers, 74 % mobile phones, 53 % answering machines and 36% have data communications equipment (modems or ISDN) Only 9% have pagers.
- Retailers are least likely to have a fax (82%) or a computer (71%), but many have data communications for checking payment cards, and 15% have pagers.
- Computers are used by 76% of firms for word processing - the most common application - followed by invoicing and credit control (71%). Although 68% use computers for accounting purposes, only 39% of firms have computerised their payroll.
- Computer literacy is claimed by only 57% of respondents, and only half of small business owners take sole responsibility for strategic information technology decisions in their business. Two-thirds of respondents find it difficult to keep up with developments in IT. This is true for all regions and activity sectors, and for most sizes of firms.
- Recruitment - Only 18% of respondents report difficulty in recruiting computer-literate: staff in manufacturing it is only 12%.
- The importance of IT to business development is widely recognised in comments by respondents, but IT is not a panacea for all problems. There is some criticism both of computer training and support services.

This study is encouraging if it is a similar situation across Europe and in other SME sectors particularly for stimulating the development of *telematic-based learning services*.

## 5 Understanding the Process of Innovation Transfer within a SME Training Context

### Introduction

The diffusion of new technologies and ideas throughout the economies of the European Union, and especially among SMEs, is considered to be an important ingredient in securing and increasing competitiveness. This chapter attempts to provide an understanding of the process of innovation transfer within a SME training context. Networking amongst organisations and individuals is critical to this process. Understanding the process will make it possible to decide which networks will be able to be most effective at different points within the innovation transfer process.

This study draws upon the work of the European Commission's Strategic Programme for Innovation and Technology Transfer (SPRINT) which since 1984 has supported the foundation and initial operation of transnational technology brokers, research and technology organisations, regional development agencies and chambers of commerce.

### What is Innovation?

The UK Department for Trade and Industry defines innovation as "the successful exploitation of new ideas."<sup>48</sup> It is not just about technology and inventions. An invention is an original or scientific insight, whereas an innovation is something new in practical life: a product, process or service meeting a real demand or need. Inventions do not translate automatically into innovations. According to the SPRINT manual "successful innovation is founded on a marriage of technical competence and market knowledge: identifying solvent customer demand and marshalling available technologies to provide economic solutions."<sup>49</sup>

Sources of technology and market information for SMEs can be divided into the dissemination and acquisition of technology, knowledge and know-how:-

- *Dissemination* mechanisms are generally *supply driven* and play a key role in helping firms to keep abreast of new developments. They include the SMEs immediate networks of customers, suppliers, subcontractors and their competitors. Other key dissemination mechanisms are in particular, trade journal and industrial fairs.
- *Acquisition mechanisms* are generally *demand led*: an SME identifies a need to acquire new technology or know-how and then sets about finding a supplier.

Dissemination and acquisition mechanisms are often connected: dissemination mechanisms may first alert an SME to a Technology that it subsequently sets out to acquire.

Innovation can involve:

- product innovation - development of products, tools or devices
- process innovation - development of new ideas, approaches or techniques

### Innovation transfer routes and the key players

The purpose of the study is to identify networks which will encourage SMEs to use telematics based learning services. But the key players have to be identified as well as the routes along which this innovation transfer moves.

The key players are:

- SME
- Supplier to an SME
- Training Provider
- Business Advice Centre
- Trade/Professional Association

What should be transferred:

- telematic tools - video-conferencing systems, computer conferencing systems, satellite broadcasting
- new teaching and learning styles - distance learning, just in time learning, learning on demand

There is no doubt that the need to innovate and acquire new technology are not goals in themselves but are tools to achieve an objective. It is clear that entrepreneurs will only innovate and acquire new technology if they can see a benefit by doing so. Thus it is not surprising that market and competition pressures constitute the main impulse for both activities. However expressed, all surveys clearly demonstrate that the main 'push' comes from the market competition, pure 'technology pull' innovation being very rare.<sup>50</sup>

With "technology pull" innovation being very rare among entrepreneurs in the market oriented manufacturing sectors it could be argued that as training providers tend to come mainly from the public sector even less innovation is likely because they tend to be less market oriented. However, a counter argument could be that public sector training providers could be more innovative as they are subjected less to market forces. More research is needed in this area.

When it comes to supplying innovative ideas in Danish and German industries marketing departments play a greater role than production departments, and in Germany are even more important than R&D departments. Amongst external sources, customers and competitors play a major role in stimulating innovation.<sup>51</sup>

Further work is needed to make some comparisons with training providers. The marketing of training to SMEs generally tends not to be very successful. A mismatch has tended to often occur with the tendency to just market what the provider thinks is needed. If the SME does not take up the offer alternative solutions have not been developed, probably because awareness of what could be offered through telematic-based learning systems is low or non-existent. The media is now beginning to create large scale public awareness of what is possible via the Internet for example. Awareness raising amongst those marketing training courses could provide an effective catalyst for stimulating the development of telematic-based learning services. The marketing manager could be an effective go-between, between customers and providers of learning.

Innovation is not a simple process. Factors playing a role in innovative activities are indeed numerous and are dependent upon all economic agents, not only entrepreneurs, but also consumers, workers as well as the state. Even so, entrepreneurs remain the main actors in the innovation and acquisition of technology. Their ability to innovate and their attitude towards innovation and technological modernisation are strongly dependent upon and influenced by their environment. Their incentives to innovate rely on several internal and external factors:

- visibility of technological opportunities (access to information);
- demand and the degree of acceptance of the market;
- competitive pressures;
- technical abilities of the entrepreneurs and the general level of research and technology in their immediate environment and their access to it;
- financial and human resources they can raise and mobilise

These factors clearly help to explain differences in the degree of technological development between European countries. SMEs in large advanced countries have clear advantages across all factors. At the opposite end of the scale, low levels of qualified labour, poor supply of technological resources, markets which have long been protected from external pressures (especially in Greece, Portugal and Spain) and non-demanding customers, have all constituted major handicaps for the smaller less advanced countries. In contrast, SMEs in small advanced economies benefit from high income internal markets, exacting customers, a highly trained workforce in a technological-based environment and the necessity to find external markets because of their small internal market.<sup>52</sup>

A Danish Study suggested that:

- technology can be acquired via several sources;
- larger enterprises use more numerous sources of supply;
- differences in terms of behaviour between medium-sized enterprises and LSEs are less important than differences between small-sized enterprises and the two other groups;
- differences in size class behaviour are especially important vis-à-vis the geographic origin of purchase. The larger the enterprise the more likely it is to buy technology from foreign markets;
- small enterprises appear to have poor access to technical consultants (compared to larger enterprises);
- it is interesting to note that buying technology through purchasing enterprises plays as important a role as patents. Incidentally this method of acquiring technology is often neglected by studies on diffusion of technology.<sup>53</sup>

Without doubt, risk is the first 'psychological' barrier limiting innovation. The perception of risk tends to increase with the size of the enterprise. Behind risk, major barriers are cost and financing problems and a lack of skilled personnel. These two barriers are especially important in the smallest enterprises. It is also noteworthy that only the smallest of enterprises seem to face co-operation related problems. In Denmark, insufficient market research is of more concern to medium and large enterprises than small ones. This could be because the latter are closer to their market.<sup>54</sup>

In German manufacturing enterprises, the relative cost of innovation is the first barrier, irrespective of size, followed by the problems of finding adequate personnel, financing problems organisational constraints and lack of co-operation.<sup>55</sup> In France, the largest obstacle to innovation activity for innovative SMEs are difficulties in human resource management, followed by difficulties in managing technological resources, and thirdly the financial situation of the enterprise.<sup>56</sup>

Factors impacting upon the propensity to innovate:

- environment (clients, suppliers, contractors and subcontractors, distributors, competitors, scientific, technical, legal and financial 'conditions')
- internal human resources;
- internal and external technological resources;
- internal and external financial resources;
- internal organisation and external 'networks';
- the strategy of the enterprise;
- the entrepreneur/top manager.<sup>57</sup>

Characteristics of innovative enterprises are not surprising. They are those which are found when studying what economic literature call 'modern' or 'high' performance enterprises:

- the entrepreneur is aware of the need to have a medium and long-term strategy for the enterprise;
- he/she tends to delegate more responsibilities and to fully exploit the ideas of personnel;
- these enterprises are attuned to their environment;
- they actively seek out information;
- they are more likely than others to be involved with formal and informal networks, partnerships and co-operation projects.<sup>58</sup>

### **Tools for aiding innovation transfer**

The word "tool" is readily understood by professionals involved in the computer and software industry and by most modern managers. In older terminology, a "tool" is understood to be something which was specifically designed to allow a user to perform a task which would not be possible otherwise. It is impossible, for example, to remove a bearing from a machine shaft without a special tool designed for this purpose. "Tools" in this context are similar in concept. They have been deliberately designed to achieve a specific purpose, they make the process simpler than alternative methods, and, with some training, can be readily used by anyone with specified skills.

The work within the European Commission SPRINT programme has identified a number of "tools" which can be used in the process of innovation transfer. Their "Tools Guide" defined a tool as a device which facilitates the collection and evaluation of data or information with the objective of recommending an outcome. Utilising a self-diagnostic process or with consultancy assistance, a participating enterprise may expect to achieve an operational or process improvement, through the use of a tool<sup>59</sup>.

There is a need to look more closely at these "tools" developed for innovation transfer process in order to identify whether they would be appropriate for the innovation transfer in telematic-based learning services or whether there is a need to develop more specific tools.

### **Barriers to Innovation in the Use of Telematics by SMEs**

Creativity, risk taking and innovation in SMEs tends to be based on a sound technical understanding and long experience within a particular sector and indeed often a specialised niche within that sector. Most goods and services purchased by SMEs are directly applicable to the exploitation of their market niche. SME managers are therefore highly expert purchasers of most of the goods and services which they acquire.



However, only a small number of SME decision makers are likely to possess an equivalent level of expertise in the area of telematics. In terms of models of innovatory behaviour and risk handling SMEs are normally in a position to act very confidently because of their considerable expertise in their own niche activity. However, when evaluating the possibility of adopting sophisticated information technologies most SME decision makers would lack the expertise necessary to make confident innovatory decisions. In these circumstances some indication of their likely behaviour as purchasers of telematics services can be postulated from classical models of risk handling in such situations. Typically purchasers of complex innovatory goods and services are more likely to adopt innovation if they are able to avail themselves of the following risk handling methods.

- Word of mouth/personal recommendation by members of peer group
- Evidence of successful adoption of the innovation by a comparable organisation
- Opportunity to evaluate the innovation in depth prior to purchase
- Evidence of widespread uptake by comparable organisations
- Evidence of significant business benefits from adoption of the innovation
- Assistance with the decision making by a respected neutral expert preferably known to them
- Acquisition of the necessary expertise to enable them to make informed decisions about the adoption of the innovation
- Information from respected neutral sources recommending the innovation and explaining its suitability for purpose
- Opportunity to purchase the innovatory product or service from a valued and respected supplier
- Opportunity for training in the use of the innovatory product or service so that they can be confident it will be utilised effectively
- Reassurance as to the reliability as to the innovatory product or service in regular use

Reference to the above criteria suggests the potential for powerful influences of SME uptake of telematic services could be generated within the networks to which they belong. Opportunity to see telematics in action perhaps in managing the network to which they participate and maximum effort to disseminate exemplars of successful use of telematics by their peers are amongst the options available. From analysis of the networks to which SMEs particularly belong and the ways in which this potential could be harnessed for accelerating uptake of telematics services is provided in the next section of this report.

## 6. SME Networks

### Introduction

In many regions of EU, and even in some quite small localities, there exist clusters of SMEs in particular sectors for a variety of historical reasons. Often a local availability of raw materials which may have become irrelevant a hundred years or more ago spawned particular craft industries which also generated clusters of skills in a locality in days when the acquisition of such capability was on a one-to-one basis.

As communications infrastructures improved and more complex trading patterns emerged more dispersed activity within sectors was superimposed on traditional patterns of activity. Plant and machinery suppliers established to service traditional local/sectorial concentrations of activity often themselves diversified from a similar skills base without sub-sectors of the engineering industry may have identifiable local or regional clusters traceable to older patterns of activity.

Newer mass production industries were often located in areas where they could build on an existing industrial resource. For example many of the EU's largest motor manufacturing plants are still located in areas where a skills base developed through 19th Century metalworking was available to pioneer manufacturers. The engineering sector in such areas quickly evolved as motor industry suppliers.

The typical SME is therefore likely to be an active member of a number of networks. In addition to their role within supply chains and networks which may be national and even transnational in character SMEs will also belong to networks such as Chambers of Commerce which will have a distinctive character with particular sectors or sub-sectors strongly represented.

Studies of these "industrial districts"<sup>60</sup> in Italy shed some light on their value as a mechanism for innovation transfer which has relevance to the adoption of telematics by SMEs and specifically its use for learning purposes. SMEs, lacking the more sophisticated information gathering systems available to larger businesses rely on networks to keep themselves up to date on matters related to supply sources, demand fluctuations and innovation. There is thus a web of "word of mouth", of newsletters and trade journals exhibitions and events, which facilitates change processes within SMEs.

It has also been proposed<sup>61</sup> that SMEs gain a similar efficiency or different efficiency comparable to large organisations if they organise production and ancillary services on a commercial basis. This may involve small firms tending to specialise in one or two stages of production. Whether it originated by accident or design, such interdependence can lead to significant collaboration to the extent even of sharing equipment or personnel. SMEs which compete with each other quite aggressively may also combine, on a pragmatic basis to form joint purchasing groups or other forms of permanent or temporary consortia. These interdependent relationships between SMEs have also been identified as a factor<sup>62</sup> in the uptake of technological innovations such as CAD/CAM.

Since SME networking is used both as the means of acquiring "know how" and as means of exchanging experience on the value of technological innovation there appears to be a strong possibility that powerful multiplier effects can be generated by pilot projects in telematics for SME training. In addition to utilising the interdependent relationships within networks of SMEs it is also possible to harness their relationships

with large customers as a means of accelerating the diffusion of innovation in telematics.

Large purchasers are becoming increasingly prescriptive as to the processes, and distribution methods they should deploy. Close supply chain relationships have resulted in significant savings of inventory as a consequence of working with much smaller numbers of suppliers geared up to offering just in time delivery. This sometimes serves to reinvigorate the industrial district model in that supply chain partners who are geographically as well as sectorially in close proximity may find it easier to develop the win-win situation and logistical efficiency associated with just in time delivery.

However, modern materials flow systems make geographical proximity much less critical even when such traumatically enhanced service specifications are introduced. Japanese manufacturers establishing manufacturing capacity with the EU would typically have a more widely geographically dispersed supplier base than they would in Japan. Similarly large European based organisations may well find themselves, to some extent, part of a local or regional industrial district. This linkage based on the historic factors associated with the development of their sector. While greater emphasis on outsourcing may sometimes have contributed to reinvigorating long established industrial district communities there are also examples of greatly enhanced links with suppliers who are much more remote geographically but members of the same sectoral community. The fact that geographic dispersal is not a barrier to very close supply chain relationships is already attributable to a significant extent to the use of telematics in controlling the logistics of distribution. As telematics systems become more widely used by SMEs and large organisations, their sophistication increases and cost decreases, the binding together of the communities to which both SMEs and large organisations belong can be expected to significantly increase.

### **Networking of SMEs**

The analysis of the role of SME networks as a mechanism for evolutionary change would suggest that once the power of telematics has been harnessed Networks will provide even more powerful conduits for upgrading SME information and expertise to face the challenge of accelerating change. However, in the short and medium term it would appear that action to accelerate the adoption of telematics will need to be sustained if EU objectives are to be achieved.

There is a need to foster, in co-operation with the Member States and chambers of commerce and industry, a demand for information, training and advice in order to overcome the specific obstacles in business. Among these initiatives, appropriate advice could significantly increase the rate of survival among SMEs. To achieve this, the potential existing among business intermediaries should be exploited to the full. In this connection, the Community could also look into the scope for improving the supply of direct advice to firms on the various aspects of their day-to-day management.<sup>63</sup>

Another means of fostering co-operation would be to provide support for participation by SMEs in enterprise networks aimed at introducing flexible and specialised production systems. This co-operation may concern, in particular, the networking of subcontracting firms in the face of the threats posed by the major changes taking place in their relations with their main customers.<sup>64</sup>

The Bangemann report on "Europe and the Global Information Society" regards SMEs as the backbone of the European economy, it considers that they do need to manage both information and managerial resources better. They need to be linked to easy access, cost-effective networks providing information on production and market openings. The competitiveness of the whole industrial fabric would be sharpened if their relationships with large companies were based on the new technologies. Networked relationships with universities, research institutes and laboratories would boost their prospects even more by helping to remedy chronic R&D deficiencies. Networking will also diminish the isolation of SMEs in Europe's less advantaged regions, helping them to upgrade their products and find wider markets.<sup>65</sup>

The G7 Summit also called for a global marketplace for SMEs to help develop an environment for open and non-discriminatory information exchange, and to demonstrate the interoperability of electronic and information co-operation and trading services on a global scale, for the benefit of SMEs.<sup>66</sup>

A key obstacle to use of telematics by SMEs lies in the very obvious fact that for telematics to be effective there needs to be a critical mass of send and receive applications to justify the investment. Large organisations are typically used to using data networks for internal administrative purposes and external links. It only needs a comparatively small proportion of total communications traffic to justify their initial connections. Whilst SMEs may be impressed by the fact that for example an electronic mail transmission may cost around 5% of the cost of sending a fax this only becomes of value when a significant number of the organisations to whom the SME would send faxes have an electronic mail address. SME networks therefore offer, by virtue of the communications traffic which they generate, an opportunity to illustrate to SMEs that their investment in telematics will generate the levels of usage which show that an investment may be justified.

As the process of evolution from communication systems based on data telematics towards those increasingly using multimedia telematics accelerates then certain points of contact locally accessible to SMEs provide points of contact where practical demonstrations of the advantages of new technology can quite naturally occur.

### **Existing Networks for SMEs**

A wide variety of networks have been established which partially or entirely address the interests of SMEs. These networks have been divided up into :-

- generic - non-sector specific
- sector specific

The generic networks have a particular role to play in disseminating knowledge and know-how mainly in the form of business and European information but may not be specifically focused on telematics or training. The sector specific networks tend to focus on the needs of their members in the form of trade or professional associations or could be strategically or economically grouped together as supply networks to a large enterprise. They may or may not be involved in training.

### **Generic Networks**

There are a number of important European networks, serving the needs of SMEs, like EuroChambres, which appear to have developed independent of European Union funding. However the most obvious and most visible networks have often developed

from European funding. But their knowledge of telematic systems and the potential of *telematic-based learning services* is often very limited.

**It is strongly recommended that better use is made of these existing networks by raising awareness of the potential of *telematic-based learning services* through the organisation of workshop briefings and the establishment of an effective mechanism for dissemination of knowledge and know-how through these networks.**

This will certainly provide added value to existing European funded projects and will create a multiplier effect as each node in the European network will also have its own more localised regional network. The basic problem is that these networks are not fed with information about the potential of *telematic-based learning services*. Some examples of these networks are given below. The database created with this report has details of the contact points.

A particular type of network which appears to have been under utilised is that of promoting innovation. As previously stated the development of *telematic-based learning services* involves the process of innovation and technology transfer. This could take two formats:-

- SMEs could be encouraged to develop telematic-based learning services or could be involved in the various components that make up the value chain.
- SMEs could be encouraged to be more aware of the potential of using telematic-based learning services as a means of updating and retraining thus gaining a competitive edge.

**Innovation Networks in particular need to be made more aware of the potential for the development of *telematic-based learning services* as an economic growth sector. Innovation networks themselves should also be making use of telematics systems as a means to disseminate information.**

#### *The European Business Network (EBN)*

The Network of Business and Innovation Centres (BIC) which has been set up under the auspices of the European Business Network over the past ten years or so provides an illustration of this point. The remit of the BICs to facilitate and promote innovation embraces the stimulation of an information society. These centres are actively promoted to SMEs and are accessible even in the European Union's less developed regions. If such centres are themselves making full use of telematics to enhance the quality of service provided to their clients, then in the normal course of their activities they would be providing powerful demonstrations of the effectiveness of telematics as a business tool. Since the remit of BICs focuses on new business development opportunities exposure to telematics in such a situation highlights the potential benefits to profitable business activity.

#### *Euro Info Centres (EICs)*

The EICs form a network of more than 200 centres throughout the EU. Each is housed in a well-established organisation such as a chamber of commerce, a development agency or a professional organisation. Every centre receives assistance from the European Commission and is linked to it and other centres by an electronic mail system.

### *BRE*

BRE - Bureau de Rapprochement des Entreprises (Business Co-operation Centre) is a network of over 450 members in more than 50 countries. They are linked to a central point in Brussels which issues open calls for co-operation - ensuring that they reach the widest possible audience.

### *BC-Net*

The Business Co-operation Network cover the entire European Union and over 25 other countries beyond, forming a network of more than 500 public and private organisations of contracts across all five continents.

### *Innovation Relay Centres*

Following a call to tender during 1995 the former VALUE Relay Centres have been renamed Innovation Relay Centres (IRC) and increased in number to 52 centres across the European Union. The main objective of the IRCs is to promote the transfer of research results and technologies in accordance with the needs expressed by the local industrial fabric.

The two main areas of work are:-

- promoting innovation in local industry, notably via the exploitation of research results and technology transfer. This will be carried out largely by facilitating the diffusion of scientific and technological information between researchers and industry after analysis of and in response to local technological requirements;
- promoting Community RTD programmes and their results in particular, provision of information on the specific programmes and assistance in drawing up research projects, support during the period of project realisation and assistance in the promotion of exploitation. IRC will provide services to the specific programmes of the Fourth Framework Programme with respect to these issues. In addition, specific programmes may call on the relay centres for the provision of additional specific services to those foreseen in relay centre contracts. In this case, these complementary tasks would be the object of direct negotiations with the specific programme concerned

Awareness of the outcomes of the research and development activities of the Telematics for Flexible and Distance Learning Programme appears to be limited.

**It is recommended that a more effective mechanism is established for feeding the Innovation Relay Centres with more information concerning developments in telematics-based learning services in order to better utilise their expertise for exploitation of results.**

### *National Awareness Partners (NAP) Network*

The National Awareness Partners Network was created under the IMPACT programme. IMPACT (Information Market Policy Actions) is a programme of the European Commission DGXIII aimed at strengthening the demand for, and supply of, electronic information services across Europe. The NAP Network aims to strengthening the demand for electronic information through increased awareness. It consists of a network of 30 organisations throughout 17 countries within the European Economic Area. The network provides training, information and knowledge on the role electronic services can play for SMEs, libraries and the further and higher education sectors, showing how their businesses and activities can benefit.



Awareness of the outcomes of the research and development activities of the Telematics for Flexible and Distance Learning Programme appears to be limited.

**It is recommended that a more effective mechanism is established for feeding the National Awareness Partners with more information concerning developments in telematics-based learning services in order to better utilise their expertise for exploitation of results.**

### *Business Links*

A specific national example of a network established by a government to serve the needs of all businesses but in particular SMEs is the Business Links Network. In England, by the end of 1995 there will be a national network of around 200 Business Links which will provide a single local point of access to the whole range of support services for businesses. They have been set up by the UK Department for Trade and Industry and there will be other similar networks in Scotland, Wales and Northern Ireland.

Business Links are local joint ventures between private and public sector bodies; such as the Training and Enterprise Councils (TECs), Chambers of Commerce, the Local Authorities, the Enterprise Agencies, universities, banks and others.

Business Link services include: personal business advisers who work with companies over time and put together packages of support; access to specialist counsellors in design, exports and innovation and technology; information and advice on grants, finance and taxation; consultancy; health checks/diagnostic services; export services; training courses.

Around £14 million will fund Innovation and Technology Counsellors for all Business Links over the next three years. Currently there are 22, but eventually there will be 70. Vouchers will be available for firms who want further help and advice with innovation and technology. Network brokers will be appointed in Business Links to encourage local firms to set up joint ventures and strategic alliances to tackle new market opportunities and share technological developments. Business Links will develop schemes to identify and give special help to firms that are starting up and have fast growth potential. Business Links will also offer a financing package service, giving advice and practical help on putting together packages and negotiating finance agreements.

The Innovation and Technology Counsellors (ITC) tend to be reactive to innovation enquiries identified by Personal Business Advisers (PBA). ITC have access to a database called "Supernet" which is accessed from a central point by the ITC sending an enquiry form. Supernet contains information about research activities and innovations relating to products, processes and systems. Unfortunately it seems to contain little information about organisations involved in developing *telematic-based learning services*.

As an ITC has to have a lot of generic knowledge concerning innovations and has a wide range of companies in its area, the number of companies likely to be interested in developing *telematic-based learning services* or currently using these services is likely to be very small. However, there is a need for an ITC to have a general awareness of the potential of *telematic-based learning services* from the point of view of realising

that this will be a potential growth market and could also be a method of overcoming specific training needs.

**A specific national recommendation is that ITCs should be "fed" with background awareness raising materials on *telematic-based learning services* with more details contained on the Supernet database. The UK Department for Trade and Industry should organise an campaign to stimulate the development of telematic multimedia learning services as a potential important growth area for a world wide market.**

**Other Member States should look closely at the Business Links example with a view to developing similar approaches in their own countries. As a pilot a effective mechanism should be devised and tested to ensure that Business Links and in particular their Innovation and Technology Counsellors are fully aware of the potential growth area in *telematic-based learning services*.**

### *Science Parks*

Science parks have developed at different times and in different ways in the different areas of the EU. Science parks in the less favoured regions, mainly in the South, have developed more recently than those in the North and face particular problems in relation to the availability of an adequate research and innovation and industrial infrastructures as well as to problems of remoteness from major markets and centres of technology development. In many cases, science parks in the less favoured regions are still at a planning stage. Many of the more mature science parks, which are mainly in the north are developing a broader role in assisting regional economic development and in establishing wider networks.

Typically, science parks have been established in order to pursue one or more of the following objectives:

- establish and develop new technology based firms
- encourage inward investment of public sector R&D
- attract inward investment more broadly
- encourage technology transfer to local existing firms
- encourage technology transfer to local new firms

Innovative and high tech companies locate on science parks for four main reasons:

- appropriate premises
- to gain access to a high level of innovation support services and information sources
- to gain a higher market profile
- to gain advantages through linkages with complementary businesses and institutes in the same region, the same county and in other countries

The SPRINT science park initiative which provides a centre of excellence in science park development has played a major role in the dissemination of good practice by providing consultancy assistance for studies of the feasibility of proposals for new science parks.

During the early years of a science park's development, the main focus is normally on establishing the physical infrastructure and buildings and in attracting tenants. As science parks become more established, greater emphasis is often placed on providing



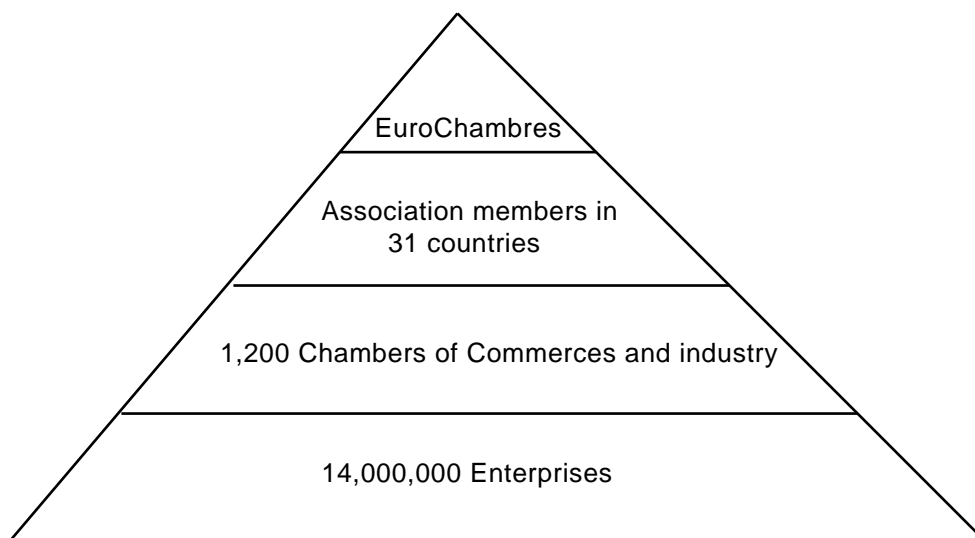
services to tenants and on establishing networks with other bodies regionally and more widely. As a consequence, the management skills needed at different stages in a science park's development will vary and there is consequently a continuing need for learning and exchange of experience.

Science parks have developed throughout the European Union in a piecemeal fashion with little overall co-ordination or systematic co-operation between science park promoters or science park managers (with the exception of the co-ordinated development of BICs and the SPRINT science park consultancy scheme.) There is a continuing strong interest in science parks throughout the EU with many new initiatives being developed. However, the results achieved by existing parks range from excellent to lacklustre and, in many areas, the performance of science parks has been disappointing to the regional development and other promoters who had high expectations of the economic benefits which science parks might bring. Some science parks will always be constrained by lack of underlying success conditions, but can still contribute to economic development.<sup>67</sup>

**It is recommended that Science Park managers are better informed about the potential for the development of telematic based learning services. Many skills and expertise that exist within the Science Parks are likely to be very useful for the development of components which could lead to the development of services.**

#### *Chambers of Commerce*

EuroChambres - the Association of European Chambers of Commerce and Industry has a direct membership comprising of the National Associations of Chambers of Commerce and Industry from 31 countries including the 15 EU countries, EFTA and other countries with direct links with the European Union. This network of 31 member organisations and their 1,200 Chambers is the largest single multinational, business network in Europe. This is the key strength of the Chamber organisation in Europe; as it ensures that EuroChambres is close to regional Chambers with their 14 million member companies, and able to respond to their changing needs and support their ambitions in the single market. The Chambers' presence in the regions also enables them to play a major role in the implementation of Regional Policy. Furthermore, as the Chambers in the majority of countries are public law "consular" bodies, they have privileged access to their national and local governments, to which they act as official advisors.



EuroChambres is a very important network and they are keen to be involved in activities which disseminate knowledge and know-how in using telematics in education and training. They are also starting to make use of electronic mail for between their own members.

**It is highly recommended that EuroChambres are encouraged to become more involved in activities which create awareness of the potential of *telematic-based learning services*.**

#### *Consultancy Networks*

Consultants are important in disseminating knowledge and know-how and spreading examples of good practice. Each consultant has its own specific expertise including knowledge brokers, trainers, and small business advisers and their own network of organisations. However, they tend to be a rather *ad hoc* group not easily networked together on a European wide scale. So it is not easy to gain a common point of entry in order to cascade information down the chain.

**It is recommended that a European directory of consultants interested in the development of *telematic-based learning services* should be established. Through a mailing list and electronic mail they can be "fed" information in this field. A first stage could be to set up a workshop to bring together consultants from across Europe.**

#### *Training Networks*

Training networks have hitherto provided useful but imperfect vehicles for the introduction of innovatory approaches to SME training for a variety of reasons. Some training providers have seen traditional methods as more profitable or have simply been conservative in their own approach to change. However, training providers and facilitating organisations committed to change, even those for whom Open/Distance learning and technology based training methods are a core activity, have sometimes had difficulty in penetrating the SME.

Seeking to overcome the resistance to training sometimes exhibited by SMEs while simultaneously engaging in the additional persuasive effort necessary to initiate innovation have caused prohibitive marketing costs for what might ultimately prove to be a rather small sale. Many technology-based training providers have focused their efforts exclusively on the very largest organisations with training budgets and numbers of learners sufficient to justify the commissioning of bespoke products.

For those who have been successful the SME market is often a small part of their turnover. For some networks, for example human resource development (HRD) professional associations or vocational education providers, technology-based training has been a minor part of their remit. Some national networks of organisations for whom training via Open/Distance Learning (ODL) or technology based approaches (TBT) such as BAOL in the UK and CAMPO in Italy have emerged and similar networks now exist across the EU.

The market for ODL/TBT proved insufficiently native to sustain SATURN as a Europe wide specialist network but other relevant networks such as EDEN, COMNET, JANUS User Association and EUROPACE 2000 are still existence.

More recently, under the 1994 French presidency, Groupe CESI a prominent provider of TBT to SMEs convened a Forum of relevant French Training networks and

identified the ODL/TBT specialist networks as gateways to and instigators of similar groupings in other member states.

Opportunities to extend existing collaborative links between national networks have been sought through recent programme calls for proposals. There now exists an infrastructure of networks capable of supporting the use of other SME networks to accelerate the uptake of telematics for SME training.

A potentially useful model is that established by Associazione CAMPO and its members in Italy who are, in effect, using the industrial district (network approach) to promote innovatory approaches to SME training accessing sectorial networks via entry points in regions where particular sectors are well represented and through links with SME specific networks such as CNA.

The EU COMETT Programme (COMMunity programme for Education and Training in Technology) was specifically designed to develop university - industry co-operation in the area of technology training (both initial and continuing training) Programme had three main types of activity:

- transnational student placements and the exchange of staff between industry and universities
- short training courses and/or developing training materials using the most advanced technologies

SMEs have been involved in EU COMETT projects in two ways. As participants in project development and/or as beneficiaries by using training materials and receiving students on placement. This has given SMEs access to a Europe-wide network of advanced knowledge. It is estimated that some 20,000 organisations have been involved in COMETT, most of them via the University Enterprise Training Partnerships (UETP) network. Through this network SMEs can access all COMETT activities such as training courses, joint training projects, student placements, personnel exchanges

University Enterprise Training Partnerships (UETPs), the backbone of the COMETT programme. Acting as the interface between industry and education, UETPs analyse training needs, provide specialised information services and organise student placements and short courses. There are currently 205 UETPs in 19 countries throughout Europe operating on a local, regional, national and European level, UETPs may be regional or sectional in nature. Regional UETPs cover a particular geographic area, while sectorial UETPs focus on a specific technology area or industrial sector.<sup>68</sup>

SMILENET has also developed from another EU funded Programme - Telematics for Flexible and Distance Learning (DELTA). The Association has evolved from the SMILE project (Small and Medium-sized infrastructure for distance learning experiments) and is now an independent, international, non-profit organisation founded under French law, with its co-ordinating bureau in Paris and has regional bureau located throughout Europe, in charge of specific services and events. The Association is a co-operative network of training technologies resources centres for small organisation. The purpose of the Association is the development of European networked telematic infrastructures for the advancement of tele-training and other tele-services in small organisations: SMEs, handicrafts, farmers and local authorities. The Association contributes to the widest possible use of telematic services by European SMEs, with

links to public authorities, trade associations, customers and suppliers, by raising the awareness of added-value services and communications in general amongst small organisations and increased access to trans-European data networks.

Although there are already a number of well established training networks encouraging the use of technology based training, there are still very few good examples of telematic-based learning services which could be utilised by SMEs.

## **Sector-Specific Networks**

### *Professional Networks*

There are many professional associations throughout the EU. In some countries the associations seem to be stronger than in others. Members may consist of individuals or of organisations. Some professional associations may just focus on SMEs, but it is most likely they will include members from large, medium small and micro organisation including members from universities and research centres. The "subject" is binding them together. An example of one type of professional association is the UK Institution of Electrical Engineers (IEE) which has 135,000 individual members including 30,000 based outside the UK and 60 industrial members. Currently, it is impossible for them to identify which members work at SMEs. They do operate a continuing Professional Development Scheme and do have a publications department which offers open and distance learning materials, but mainly in the form of paper-based and video-based material. Their abstract service is accessible on-line and is used world wide. However, the Association does not appear to offer any form of *telematic-based learning service*.

**Professional association like the IEE are just ripe for developing of telematic-based learning services and could become excellent exemplars, which will enable widespread adoption. It is highly recommended that professional associations across Europe are made more aware of the potential of telematic-based learning services and are encouraged to take part in pilot projects which test out these services among their members.**

### *Trade Networks*

Reference has already been made to the quite complex patterns of trading between SMEs within a given sector, typified by the Italian industrial district. This pattern of inter-trading with SMEs, sometimes functioning in a competitive mode and at other times forming formal and informal consortia to tackle major projects, is a business environment where, in the future, the widespread use of telematics can be expected to generate significant economic benefits both to the participating SMEs and to the economies of the European Union. While sometimes particular fragments of these networks, may be formally organised, in a trade association, some of the most productive networking is generated on an ad-hoc basis to meet appropriate priorities. The nature of trade networks is such that they are therefore likely to feature less prominently in the early adoption of telematics than some other networks to which SMEs belong.

However, once a critical mass of transactions within such systems has become established it seems reasonable to propose that the pressure on the majority of SMEs to participate should increase providing a powerful stimulus to very wide uptake. While many such networks may tend to be reactive rather than proactive there will nevertheless be some trade networks which could specifically be targeted. Examples might be in areas such as viniculture and other aspects of agri-business where formal co-operatives often exist and where both formal and informal co-operative activity can

be powerfully mediated by the use of telematics. Other examples of trade networks which could benefit significantly from the use of telematics and where demonstration projects could have a powerful effect would include craft sectors, particularly those whose marketing activity is linked to tourism.

Although many Trade Networks have a European geographic clustering, they often provides "entry points" at local or regional level, through which twin track multiplier effects can be generated EU wide via the sector in question and locally or regionally across sectors.

Although by no means confined to the less intensively industrialised regions of the EU, trade networks can sometimes be particularly significant in the regions where the economy is partly or predominantly rural and where tourism is important but not on the very large scale of the most popular coastal regions. Trade networks can also provide contract points for SMEs with high added value outputs.

For example, the Limousin region which is perhaps most well know for its attractive rural areas and for its ceramics industry. The ceramics industry is both an important international exporter and also a tourist attraction. Indeed the smallest artisan ceramics producers would probably view tourists as a key client group. Local expertise in electrical engineering including many SMEs which supports ceramics manufacture is also today much more widely deployed with the high technology electrical and electronic sectors which employ 20% of the population.

At local and regional levels SME networks function across sectors and help to cement the symbiotic economic relationship between them. In regional economies which have diversified away from the archetypal industrial district with one particularly important sector there remains scope for SME telematics applications demonstration projects to be disseminated "vertically" - EU wide throughout the chosen sector within a region. Regional administrations may be valuable partners in co-ordinating the cross-over between local networks such as Chambers of Commerce and sectorial networks with important regional entry points.

### *Supply Networks*

The economy of the European Union involves many industrial sectors where supply chains may be dominated by large purchasers serviced by small suppliers. Increasing emphasis on quality and the sophisticated logistics arising from "just in time delivery" and similar methods of inventory control are giving rise to much closer and more complex ties between autonomous SMEs and their major customers. Over the next few years many SMEs are likely to be stimulated to make their first investment in the use of telematics as a consequence of a need to provide enhanced service to a single key client. They will then have the facility to make wider use of telematics systems and services.

Many service providers to SMEs are likely to be among the leaders in telematics for business administration. The banking sector for example, was an early participant in EU telematics R & D programmes through the MALIBU project in the third framework. Other areas of the financial services sector are also likely through day to day contact to provide SMEs with demonstrations of the power of information technology. Most SMEs achieve their first exposure to the use of PCs for business administration through the use of accounts packages. In many instances demonstration of the validity of this option together with encouragement and support in adopting such

application came via the providers of accountancy services to SMEs. Similar patterns are likely to be repeated in the uptake of telematics.

While many supply chain networks are likely to provide examples of market forces service as a stimulus to the uptake of telematics there may be some sectors where external stimuli may be beneficial. There are many sectors where the low overhead structure and cost effectiveness of SMEs allows manufacturing to survive within the European Union on a somewhat tenuous basis in the face of intense competition from overseas competitor nations with lower wage structures and inferior social benefits. Examples of such sectors would be the clothing, textile and footwear sectors.

Within such sectors large retail chains such as Benetton and Marks & Spencer, who are closest to the needs of end users, exert considerable authority over supply chains of which SMEs are prominent members.

The level of detail of specifications provided for the retailer would be likely to dictate raw materials sources and often aspects of the manufacturing process which would, in other circumstances be decisions entirely internal to the SME itself. The large retailers have functioned as extremely powerful change agents often influencing or even demanding changes in manufacturing methods and the logistics of distribution. R & D and other technical and design experts in the large purchaser organisation have been a source of expertise, not normally available to SMEs which has indirectly and sometimes even directly provided know how which has assisted modernisation of SME suppliers as the large user continues its quest for quality and cost effectiveness.

The level of interdependency of small suppliers and large buyers leads to increased information flows with consequent pressures to exploit data telematics. However, there are also many possible applications of multimedia telematics. For example, whilst physical samples of new products would be considered essential to final purchase decisions modern three-dimensional design packages or remote examination of sample items could facilitate decision making process, since design and manufacture are often at different locations and indeed conducted by different organisations. Multimedia telematics should, in future, have a role in integrating these functions as closely as though they were on the same site. Dominant organisations within supply chains often seek to stimulate, facilitate or even provide training related to industrial changes. Multimedia telematics offers considerable scope for enhancing this training role, particularly for the training of other supply chain members in the benefits and applications of multimedia telematics as a business tool.

The SMEs involved in such concepts are often geographically clustered within an industrial district. In such circumstances the sector in question is important to the local economy and plays a leading role within local networks such as Chambers of Commerce. Wider adoption of multimedia telematics within such sectorial clusters can therefore be expected to exert a multiplier effect.

While most supply chain influenced technological change has been stimulated purely by market forces the sectors in question, such as textiles, automotive etc., tend to be those facing fierce international competition and tend to be also of regional, national and EU wide strategic significance. These factors together with possible multiplier effects may be thought to provide a possible rationale for EU support to accelerate telematics uptake within such networks.

## 7. Financial mechanisms to support SME training

The funding of training in SMEs is dependant on the local conditions in each of the EU and EFTA countries. Various strategies have been adopted by EU countries to promote, encourage or compel organisations to train. In general, outside the mainstream state funding for education and training, organisations and networks use their own funds or funds they have loaned from Banks.

CEDEFOP carried out a series of "Country studies on the financing of vocational training with particular reference to continuing training for the gainfully employed"<sup>69</sup> in 1988 (FOCUS II). The countries covered were Belgium, Denmark, Spain, FDR, France, Greece, Ireland, Italy, UK, Netherlands, and Portugal. These studies identified the sources of funding for continuing training and explore the government policies to support training. The studies did not look particularly at SMEs or at the use of telematics however they do indicate how training is funded in the EU. The studies had problems identifying with any precision funding for training since firms do not always disclose training costs and the term "training" covers a wide range of activities. The studies did however gain some insight into the expenditure on continuing training, which is highest in the public sector, less lavish in the private sector and lowest in the case of private households. The figures on private-sector spending in some countries are complete (though not always comparable), but in other cases only figures on certain sectors are available; in Belgium only three sectors were examined; in Portugal the survey covered 4,000 large, medium-sized and small firms. In other cases figures on firms spending are only available where they have received subsidies. In these circumstances generalisations drawn from the FOCUS II studies are misleading and dangerous. The studies point to the fact that information on the funding for training in SMEs is very hard to extract, as is the precise source of that funding.

The problems an SME has with funding its growth and development has been recognised by the "growth policy initiative" as part of the Edinburgh Summit of December 1992. At that Summit it was agreed that the European Investment Fund should provide funds through the European Investment Bank. Currently the European Budget provides 2% of interest on loans to SMEs through a network of intermediaries such as the Co-operative Banks. These loans are primarily for infrastructure and capital projects, but training associated with these projects may be included. This scheme closed 31 July 95, however this is unlikely to be the last scheme of this type.

An example of government funding of training in SMEs can be taken from the Finnish model<sup>70</sup>. The bulk of all training arranged for Finnish SMEs is wholly or partly financed from the public purse. The main sources of funding are ministries: the Ministry of Trade and Industry, the ministry of Labour, and the Ministry of Education. The Ministry of Trade and industry supports its training schemes by subventing the participation fees. The rate of subvention varies between 50% and 70% depending on both the target group and the content of the training. Most of the subvention goes to the training aimed at fledgling or emergent businesses.

To develop and train SME personnel, funds can also be granted toward the business's own development projects, if the aim of these is to promote the firm's managerial, marketing or standard of products or production. A ceiling for this support is 50% of the acceptable costs of the project.



The Labour Ministry mainly funds training for the unemployed or disadvantaged persons and the Ministry of Education grants aid toward personnel training (supplied by its own network of training units)

There appears to be no specific funding for open distance learning (ODL) or telematics in Finland however the Finnish regional business service offices store information on SME training on a free access database. The information is also retrievable via TeleSampo or INFOtel (networks) in TIKO a personnel training database and AIKP (on-line databases) SMEs must be telematically aware to access these databases.

In Germany a motivation to train in SMEs is that training costs can be offset against a companies taxable profits. An other, more compulsory approach, to support continuing education have been adopted in France where companies directly contribute 1.2% of their pre-tax salary bill into a fund which can be used to fund institutions providing vocational training or their own in-house training. It is estimated that industrial contributions in this area now represent 31% of total higher education resources, an increase of 20% since 1988/89.<sup>71</sup> Overall the effect of these funding approaches does not specifically support SME training or the use of telematics.

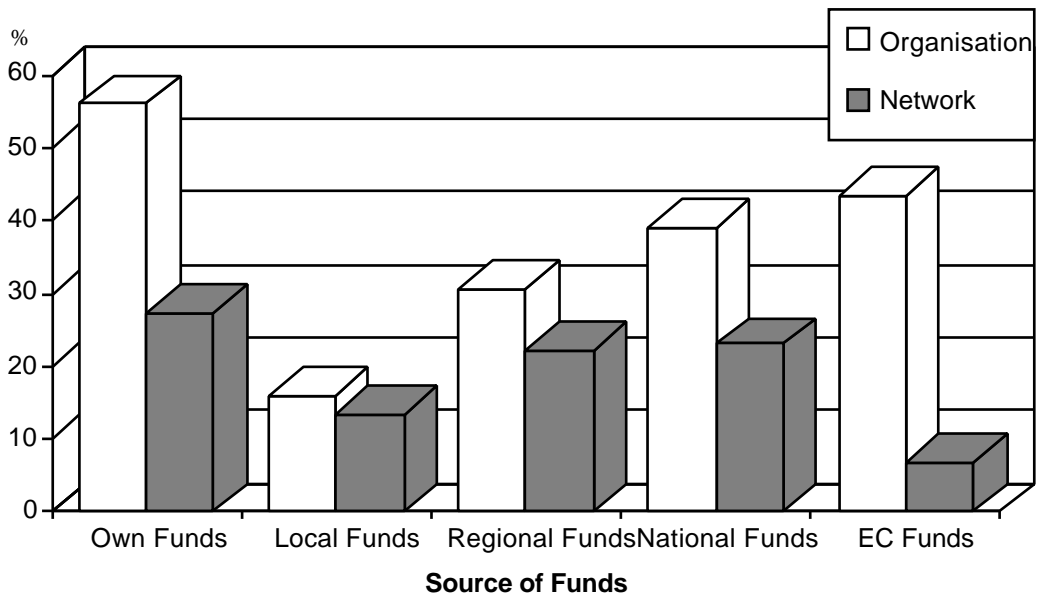
Across the EU there is some evidence of the introduction of tax relief or financial assistance through loans for individuals paying for their training, and also to help small employers to invest in developing the skills of their employees. There are some signs, too, of a new approach to the organisation of working life, with a higher degree of alternation between work, training and leave, for example, leave schemes so as to increase job rotation under which continuing training of employees is combined with job training of unemployed persons who are recruited as substitutes for those on training leave.<sup>72</sup>

In the UK a new scheme "Small Firms Training Loans"(August 1995) has been set up to support training in SMEs by giving a 13 month repayment holiday on loans of between £500 and £125,000. The scheme is funded by UK government funds. The interest on the loan is paid by the sponsoring government department for the holiday period. The loan are arranged through major clearing banks, and authorised by the local Training and Enterprise Council (TEC). This scheme enables SMEs to fund training with no initial cost. However there is no specific linkage with Telematics.

There are a range of different strategies adopted by EU and EFTA countries to encourage training in SMEs however the uptake of training or the effectiveness of a particular strategy is less well documented. Bearing in mind the difficulty in gathering relevant data, the survey conducted as part of this study asked general questions on the source and amount of funding used for training. From this study a European picture can be extracted. The 'source of funds' information identifies if resources are for the responding organisation, (which may be a government funded agent or an independent organisation), or for its network of SMEs. The amount of resource is identified in four groups (less than 10 kecu, 10 kecu to 100 kecu, 100 kecu to 1 mecu, and greater than 1 mecu). The financial support for training in organisations and networks of SMEs is separated into 'own funds', local, regional, national and EC funds. This is shown by the chart below



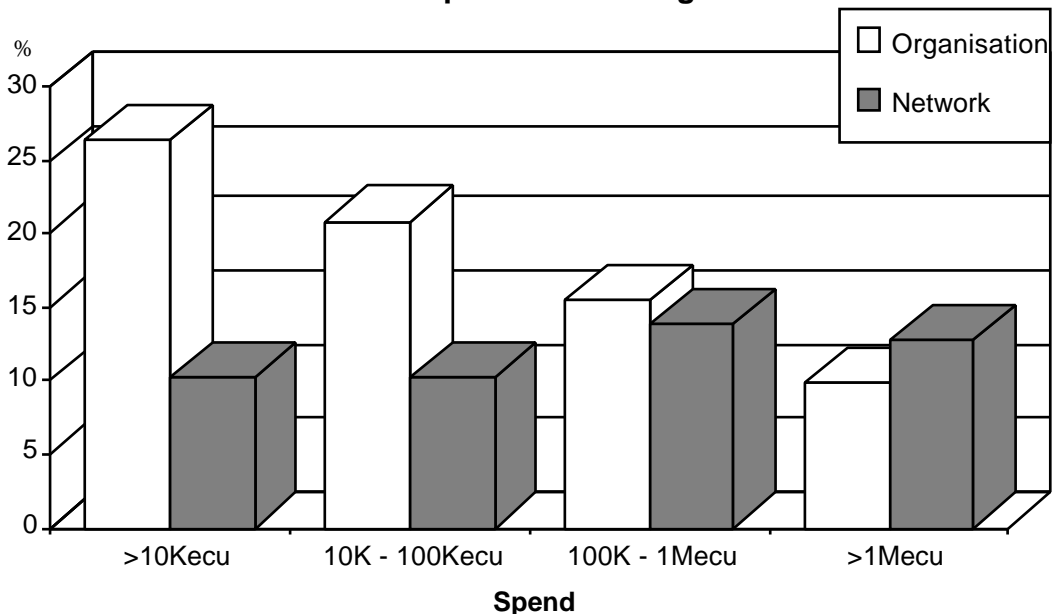
### Sources of Funds used for Training



Organisations and networks use a mix of funding sources for training, but notably 56% of organisations surveyed use their 'own' funds for training. This data indicates that organisations draw on their own resources (which may be funds on loan to the organisation), in conjunction with state or EC funds where possible. In contrast to the responding organisations, the survey indicated only 7% of networks access EC funds.

The actual declared spend on training follows a predictable pattern. The majority of organisations and networks have a spend proportional to their size.

### Declared Spend on Training



Outside EC programmes there is little evidence of specific financial support by governments for telematic training. However many surveyed organisations were telematically aware (46% use Email and 45% use on-line databases) and so would, with the appropriate motivation, be able to promote telematics and training.

## *ADAPT*

The ADAPT Initiative was launched by the European Commission in July 1994 and is funded through the European Social Fund (ESF). The ESF is one of three Structural Funds established under the former Treaty of Rome to strengthen the economic and social cohesion of the European Community, the other two funds are the European Regional Development (ERDF) and the European Agricultural Guidance and Guarantee Fund - Guidance Section (EAGGF). The overall aim of the ESF is to help improve employment opportunities by providing financial support for the running costs for vocational training schemes and job creation measures.

ADAPT is a new Human Resource Community Initiative which has four interrelated objectives:

- to accelerate the adaptation of the workforce to industrial change;
- to increase the competitiveness of industry, services and commerce;
- to prevent unemployment by developing the workforce through improving qualifications and their internal and external flexibility and ensuring greater occupational mobility;
- to anticipate and accelerate the development of new jobs and new activities, particularly labour-intensive ones; this includes exploiting the potential of SMEs.

These objectives are to be achieved through the creation and development on a transnational basis, of innovative pilot projects

ADAPT seeks to encourage innovative practices. Innovation may include, for example new methods of delivery, new systems, new skills/qualifications and/or new job creation initiatives.

Projects may be innovatory either at a national or European level; or at a regional level in exceptional circumstances if the applicant is able to provide justification. These new approaches therefore do not necessarily have to be innovative in the sense they have never been tried. Exceptionally innovation at local/regional level may be considered for applications from Objective 1 areas.

Projects must show how through the pilot action they are developing models of good practice which can subsequently be replicated at European level creating a multiplier effect. Actions must have the potential to be transferable within the European Union and should in time become part of mainstream training/job creation strategy and/or contribute to national policy development in the respective Member State and elsewhere within the European Union.

Each Member State has an Operational Programme (OP) which has to be approved by the European Commission. For example the UK OP contains four categories of measures under which applications are invited:

- i) supply of training, counselling and guidance;
- ii) anticipation of labour market needs, promotion of networking and new employment opportunities;
- iii) adaptation of support structures and systems;
- iv) information dissemination and awareness actions

ADAPT will support transnational pilot actions which:

- test innovative approaches to vocational training and employment

- encourage the exchange of know-how and expertise between Member States of the Community and involve a range of partners;
- complement actions supported through other European Programmes

For the UK applications are only allowed through "intermediaries operating in the public interest." In the UK these include Training and Enterprise Councils (TECs); Local Enterprise Companies (LECs); Business Links; Business Connect Wales; Local Authorities, Further and Higher Education Institutions; Industry Training Organisations (ITOs) and Government Departments.

Projects aimed at SMEs are considered to be a high priority and under one measure particular emphasis will be placed on projects to improve SMEs' access to information and advice about innovative and flexible learning resources such as open learning and technology-based training. This is a result of a fundamental review of open and flexible learning (OFL) which concluded that a major obstacle to its take-up and effective use, especially among SMEs, is poor flow of information and lack of independent advice.

Dateline for the first Call for applications for the current call was 15 September 1995 for funding up till 31 December 1997. A second call for applications for the period 1998/9 is expected in the Autumn 1997.

### *EMPLOYMENT*

EMPLOYMENT is a Human Resource Community Initiative targeting groups which face specific difficulties in the employment market. The initiative has three strands:

- i) EMPLOYMENT-NOW
- ii) EMPLOYMENT-HORIZON
- iii) EMPLOYMENT-YOUTHSTART

The objectives of EMPLOYMENT are:

- to promote a Community dimension for vocational training and employment promotion and to contribute to the continuing development of human resource;
- to foster convergence of occupational skills, in particular between Objective 1 regions and other regions as well as promoting the occupational and geographical mobility of workers;
- to promote equal opportunities

Employment will support transnational pilot actions which:

- test innovative approaches to vocational training and employment
- encourage the exchange of know-how and expertise between Member States of the Community and involve a range of partners;
- disseminate models of good practice established through the initiative i.e. the multiplier effect;
- complement actions supported through other European Community Programmes

Each Member State has to produce its own Operational Programme (OP). For example the UK OP has four categories of actions which are eligible under each strand of Employment. These are:

- i) the delivery of training, guidance, counselling and employment systems;
- ii) the delivery of training;

- iii) job creation and support for the start-up of new businesses and co-operatives;
- iv) information dissemination and awareness actions.

Projects usually have to take place in Objective 1, 2 and 5B areas

EMPLOYMENT seeks to encourage innovative practices which may include, for example, new methods of delivery, new systems and/or new qualifications. Emphasis is also placed on the development of models of good practice, and the multiplier effect by means of effective dissemination.

EMPLOYMENT-NOW - overall objective of is to contribute to the promotion of equal opportunities between men and women by the implementation on a transnational basis, of pilot projects of an innovatory nature. Measures include initial and continuing training especially in small and medium sized enterprises (SMEs) and in sectors subject to industrial change, to adapt the female workforce to the changing labour market and to improve their career development.

The purpose is to improve equal opportunities for women with regard to employment, mainly through measures concerning training and access to high-tech and management jobs.

Examples of eligible measures include the development of co-operation and of training and employment networks; the establishment of guidance and pre-training services and of local services to assist with the establishment of SMEs and co-operatives; strengthening links between vocational training bodies and businesses. In objective 1 regions, links can be established between training, higher education and firms offering personalised and flexible training, initial and continuing training (particularly in SMEs and exposed sectors) training in business management; training of training,<sup>73</sup>

EMPLOYMENT-HORIZON - the overall objective is to improve the labour market entry opportunities for disabled and certain other disadvantaged groups, through the creation and development, on a transnational basis, of pilot projects of an innovatory nature. Measures include the implementation of flexible training and learning systems such as distance and interactive computer learning.

EMPLOYMENT - YOUTHSTART - aims to improve the labour market entry opportunities for young people under 20 years of age, through the creation and development, on a transnational basis, of pilot projects of an innovatory nature. It must be noted that a high percentage of young people get their first job in an SME. One measure includes the design, development and delivery of innovative approaches to labour market integration of young people especially through distance learning.

The call for application for 1995-1997 closed at the end of April 1995.

### *LEONARDO DA VINCI*

This new EU programme seeks to prepare for the 21st century by improving the quality of vocational training systems and their capacity for innovation which are key factors for mastering technological and industrial change and its impact upon work organisation and the competitiveness of enterprises. It is concerned with enabling vocational training to prepare for the professions of tomorrow, to anticipate change, to visualize the future, to prepare and experiment with new ways and new methods. LEONARDO will facilitate the taking forward of initiatives successfully developed under COMETT, PETRA, FORCE and EUROTECNET and add new dimensions.

The objective of the programme is to promote projects to improve quality and innovation in vocational training in Europe. LEONARDO will enhance the value of national training systems, assuring the promotion and dissemination of the best in each and bring added value through transnational co-operation between different actors and operators in the training field in the Member States. In addition, it aims to take forward the European dimension in training.

"Life-long learning" is a central idea of the LEONARDO programme. Initial training and continuing training must no longer be isolated phases in the development of the individual. They must merge into a general concept of training as an on-going process, aiming to ensure, at the same time, the personal development of the individual, as well as their professional integration and progression.

In order to promote vocational training at the Community level, the LEONARDO programme provides for three types of measures:

- devising, developing and testing transnational pilot projects through, for example, the development of common training modules, the anticipation of training needs, the adaptation of content and methods, the training of trainers and language training,
- transnational placement and exchange programmes, will enable different groups (young people in initial training, university students, managers of human resources) to receive part of their training in another Member State, and enable trainers and specialists in the area of training to improve the quality of their work through the opportunity of an exchange.
- the development of knowledge in the area of vocational training through surveys and analyses undertaken on the basis of a community work plan, for example, in the fields of the anticipation of training needs, transparency of qualifications, new types of apprenticeship and training, quality, investment in training, incentives for training as well as statistics on training provision, finance and beneficiaries.

In addition, projects must seek to promote:

- co-operation between different types of organisation: actions will be carried out by partnerships or networks bringing together different actors and operators, such as public authorities, enterprises, training organisations, social partners, universities and training schools;
- transversal co-operation between areas of training to contribute to overcoming outdated conventions or compartmentalisation of actions and facilitate the transfer of innovation;
- the anticipation of training needs and the dissemination of innovation.

#### *Socrates - Open and Distance Learning*

SOCRATES is the European Community action programme for co-operation in the field of education and of promoting lifelong learning in response to the challenge of addressing the constantly evolving educational needs resulting from technological change, quickening obsolescence of knowledge, and the role of education in enabling people to fulfil their individual potential. One of the overall objectives is to encourage

open and distance education in the context of the programme. This could involve the development of learning services for SMEs.

The SOCRATES Programme contains two different sets of measures designed to support open and distance learning (ODL) in Europe. One set of measures is devoted specifically and exclusively to the support of ODL and the use of new information and communication technology in the field of education. Support is provided for various types of co-operative activity carried out within the framework of European partnerships and for "Observatory projects" designed to monitor developments in these areas.

The SOCRATES measures focusing specifically on the support of ODL are designed to contribute to objectives:

- facilitating co-operation between organisations and institutions in the field of ODL
- enhancing the skills of teachers, trainers and managers in the use of ODL techniques
- improving the quality and user-friendliness of ODL products
- encouraging the recognition of qualifications obtained through ODL

From the wide range of activities covered by ODL and potentially requiring co-operation at European level, the emphasis within SOCRATES is essentially on stimulating European co-operation in:

- the use of distance learning as a means of overcoming barriers to physical mobility;
- the use of information and communication technology for improving the quality of 'conventional' education.

Projects could be developed involving individuals in certain sectors of SMEs in need of professional updating through the utilisation of telematic based learning services with universities or training organisations as content providers.

#### *Co-operation in the Information Society*

The aim of this call is to introduce the concept of the information society into the regional development policies of the less-developed regions of the European Union. This should take into account employment policy priorities, while developing a debate at regional level on the information society and on new services, both by encouraging their use as well as disseminating models of best practice.

There will be two fields of action:

One will focus on strategy and action for the development of an information society in the less-developed regions through partnership between public and private actors in the regions. The objective is twofold:

- to develop a consensus on a regional strategy that is capable of meeting the challenges and opportunities offered by the information society
- to promote the involvement and co-operation of actors through an action plan that is likely to contribute to economic development and employment in the regions concerned, including an evaluation of the feasibility of their application.

The target group for this activity are regional authorities, in particular those from NUS II areas (Nomenclature of Statistical Territorial Units: II level), a significant part of whose populations live in Objective 1, 2, 5b and 6 regions.

The second activity will involve pilot projects demonstrating best practice in regional development through the information society. This includes preparing for the establishment and launch of innovative applications based on information and communication technologies, notably those which focus on job creation in new economic sectors and on sufficient training in less-developed regions. Those sectors believed to have a particularly strong economic regional development potential will be given priority.

Proposals for for this second activity should come from at least two different organisations from two regions of different of a different Member States. Priority will be given to proposals involving six regions from at least three different EU Member States. At least three regions participating in the pilot projects should come from Objective 1 areas.

The overall budget for 1995-1999 period is 20 million ECU, of which, 15 million will come from the Article 10 of the European Regional Development and 5 million ECU from Article 6 of the European Social Fund. Each project will last between 18 and 24 months duration. The Call for Proposals will be published before the end of September 1995.

#### *INFO2000*

INFO2000 is a EU programme to encourage Europe's information providers to develop new multimedia products and services and to stimulate user demand for these products and services. It will focus on the transition from print to electronic publishing and on the interactive multimedia services that are currently emerging. The proposed actions serve three long-term strategic objectives:

- facilitating the development of the European content industry
- optimising the contribution of new information services to growth, competitiveness and employment in Europe
- maximising the contribution of advanced information services to the professional, social and cultural development of the citizens of Europe.

These objectives aim at maintaining, extending and exploiting Europe's strength in content whilst narrowing the gap with our competitors. They are designed to encourage an integrated development across the European Union.

Lack of awareness of the potential of the new multimedia information products and services is an important factor constraining demand. This action line contributes to redressing that situation by adding a European dimension to awareness and user-group activities taking place at the national or regional level. Specific attention will be given to favouring demand development in less-favoured and peripheral regions of the Union.

Under the IMPACT programme a network of organisations in the Member States has been created that have a responsibility for conducting awareness and information campaigns in relation to new information services. In different Member States this role is performed by different organisations like chambers of commerce, professional



organisations or public bodies. By working in a European network these organisations are able to add a European dimension to their activities.

Under INFO2000 this successful formula will be continued and extended. The involvement of the Community in the network as a catalyst and a co-ordinator adds value to the individual activities and puts these activities in a clear European context. Apart from financial support for specific activities with a European dimension the Commission will encourage the exchange of know-how and experience, the use of common communication and information facilities, and co-operation between the various organisations in joint projects.

The organisations in the network will perform the following tasks:

- provide access to information collections and catalogues across the European Union;
- demonstrate and facilitate access to the European information highways;
- advise users on the possible sources for satisfying their multimedia content needs, both nationally and internationally;
- organise co-ordinated European awareness campaigns at the national or regional level;
- stimulate the training of users.

The main target groups for the actions will be small and medium-sized companies and libraries. The actual selection of specific target groups will be left to the national and regional organisations concerned, since they are closest to the target groups.

Following a call for proposals, a total of 30 to 50 organisations will be selected to participate in the network. Selection criteria will include knowledge of the local information market, affinity with the target groups foreseen and readiness to work in a European network. Actions which aim to stimulate women's interests in new information services are encouraged.

The network will co-operate with other relevant national organisations. It will liaise closely with other EU supported bodies and networks that have a complementary mission, such as the Information Society Project Office (ISPO), the European Information Centres (EICs), the Business Co-operation Network (BC-NET), the Value Relay Centres and the University Enterprise Training Partnerships (UETPs). Organisations from these networks could be selected in the call for proposals. Efforts will be made to avoid parallel or overlapping networks. Synergy and spin-offs will be sought with other awareness activities performed under the 4th Framework research programme such as the Advanced Communication Technologies and Services and Telematics applications programmes.

In working towards the objectives of INFO2000, the weaknesses indicated above will be tackled in an integrated and co-ordinated manner, along three action lines :

stimulating demand and raising awareness

exploiting Europe's public sector information



triggering European multimedia potential

The programme will run for four years from 1996-1999. Details of calls for proposals are likely to be made available during the Autumn of 1995. This programme could be used to stimulate awareness amongst SMEs as potential users of telematics-based learning services and projects could also be set up which encourage content providers to develop materials for SMEs.

### *Third Activity of the Fourth Framework Programme*

This third activity of the Fourth Framework Programme is a specific dissemination and exploitation programme, based on a cohesive set of measures which will operate alongside and, be closely co-ordinated with, the conventional methods for optimising the results of RTD research. There has been 293.00 million ECU allocated for this activity. The specific programme arises from the need to adopt a new, more focused approach to existing dissemination and exploitation activities, so that they take fuller account of the cumulative and interactive nature of the innovative process, as well as the specific needs of the diverse range of operators involved. The programme will also attempt to correct the dominant "technology push" trend, which was a criticism of previous programmes.

Specifically, the proposed actions will help identify the technical and economic potential of the results obtained from RTD activities and, where appropriate, provide finance for demonstration projects. The programme's activities are primarily for the benefit of SMEs and include specific measures targeted at improving the competitiveness of SMEs located in the less developed regions of the Community.

In general, the envisaged activities will be largely decentralised and depend heavily on local relays, such as the Community network of relay centres. Existing support mechanisms for innovation and dissemination at national, regional and local level will be improved by specific measures which can only be taken at the Community level. The programme incorporates, extends and supplements the dissemination and exploitation activities of the specific programmes and integrates the follow-up to SPRINT and VALUE into a single programme. It will also strive to exploit all synergies with related Community projects and schemes, such as MINT, THERMIE, OPET, etc. The envisaged actions will mainly concentrate on the fields of competence established under VALUE and SPRINT, covering:

- Supply of specialised services;
- Consolidation of the support infrastructure;
- Creation of an environment favourable to the dissemination of technologies and the exploitation of RTD results.

The Commission will pay special attention to co-ordinating the activities of the programme with the dissemination and exploitation elements of the specific RTD programmes, in order to avoid all duplication and wastage of effort, to maintain a good geographical balance in the distribution of activities, and to ensure that existing infrastructures and competencies are exploited. Under the Fourth Framework programme, about 1% of the budgets allocated to the specific programmes are earmarked for the dissemination and utilisation of the results of the programme's RTD activities.

The main objectives of the dissemination and exploitation activity are:-

- to ensure wide dissemination of research results;
- to optimise the exploitation of research and development results into innovations;
- to promote technology transfer particularly to small and medium sized enterprises;
- to support initiatives at a national or regional level in order to give them a trans-European dimension.

The programme is divided into three broad themes:-

a). dissemination and exploitation of the results of EU research including:-

- network of regional relay centres (Innovation Relay Centres)
- the Community Research and Development Service (CORDIS) and the Publications Dissemination Service
- protection of results
- exploitation of research results
- exploitation of research and the needs of society

b). dissemination of technology to enterprises, including:-

- trans-national networks providing support for the transfer and dissemination of technology
- creating an environment favouring the absorption of technologies by industry
- exchanges of information and experiences with regard to policies for the dissemination of technologies

c). financial environment for the dissemination of technology, including

- improving communications between financiers and the promoters of technological projects
- pilot actions for the stimulation of transfer and use of technologies
- technical and managerial assistance to public and private financial intermediaries

Calls for proposals have already been issued which cover technology validation and technology transfer projects responding to user needs and stemming from different stages of the innovation process.

Technology validation projects (TVPs) are aimed at taking RTD results, including know-how, through a process of adaptation and evaluation to a stage of concrete application where they can contribute to improving the competitiveness of European industry. They validate the application of research results, whatever their origin, in the fields of activity other than those in which they were initially obtained, thus promoting efficient mechanisms entailing cross-border exchange of knowledge or technologies (sector-to-sector), region-to-region)

Technology transfer projects (TTPs) are aimed at transferring and diffusing existing technologies across sectorial and national boundaries towards the adoption of these

technologies by new users. They promote efficient cross-border diffusion and transfer mechanisms (sector-to-sector, region-to-region) and help overcome obstacles to circulation and utilisation of technologies.

### *Technology Performance Financing*

Technology Performance Financing (TPF)<sup>74</sup> is a financial tool used by the Third Activity to reduce the risks involved in acquiring innovative technology. It aims to break a vicious circle by reducing the perceived risks of acquiring new technology. Companies will not acquire a technology until it is proven, but the technology cannot be proven until it is acquired by a company.

TPF is based on 'performance contracting', a system which has already been successfully tested in the US, where it has been widely used by energy-intensive companies when buying energy-saving technology. The now finished SPRINT Programme extended this principle to include other industries.

TPF reduces the perceived risk by linking payment for new technology to its performance. It also offers banks and other financial institutions project-based unsecured finance and a structured framework to help them make investment decisions.

In a typical bilateral TPF scheme, the supplier furnishes the user with their innovative technologies or services. However, although the user makes an initial down payment, the supplier receives a substantial part (up to several hundred thousand ECU) of the total cost from a bank or other financial institution in the form of a loan.

The user repays the supplier in several instalments over 2 to 3 years as a function of the new technology's performance, and may also pay a final one-off payment at the end of the project. The supplier in turn pays the bank back, with interest. Trilateral schemes may involve payments directly from user to bank.

The technology's performance is judged against a set of milestones established at the beginning by the companies involved, with the help of experts who can be supplied with the assistance of the EC. If the technology performs better than expected, both the bank and the supplier may receive a bonus. On the other hand, payments can be reduced if the technology under performs. TPF can be used mainly for the acquisition of new technology related to industrial support processes. These are fundamental to the business operation but involve technologies not directly associated with the user firm's core activity. It has been used for energy conservation, waste disposal, pollution control and risk prevention.

**It is strongly recommended that a similar scheme should be tried out with encouraging the use of a particular types of *telematic-based learning services*.**

## 8. Overall Conclusions and Recommendations

### 1 Types of SMEs

- a.) SMEs should not be considered as a homogenous mass. Some SME sectors are likely to be more responsive to the utilisation of telematics -based learning than others.
- b.) A critical factor is identifying specialised networks rather than generic networks unless generic networks are to the mutual benefit of the members.

### 2 SMEs and Telematics

- a.) There are encouraging signs that in some SME sectors in some regions of the European Union SMEs already have the equipment and are utilising telematic systems for some aspects of their daily work activities.
- b.) More detailed analysis and research is still needed in this area in order to get a clearer picture of the uptake of telematic systems amongst all sectors of SMEs and across all regions of the European Union. This is critical for the uptake of *telematic-based learning services*.
- c.) SMEs are more likely to consider the use of telematic learning services if they already have existing equipment and are using it within their daily work activities

### 3. Development of telematic-based learning services

- a.) Most SMEs will require training in the native language of their employees. Although some advanced professional updating could be conducted across Europe with a commonly used language like English or French.
- b.) This can cause problems in creating the economies of scale needed to develop multimedia telematic-based learning services. However, the eventual development of "tools" which enable the easy translation of materials into other languages may start to overcome this problem.
- c.) There are hardly any good examples of telematic-based learning services specifically focused at SMEs. What does exist is generally at the project stage and has still to be proven to be sustainable in the market-place without subsidies. There is an urgent need to stimulate this type of development

### 4. Utilisation of Existing Networks

- a.) There are already many existing trans-European networks for SMEs, many of which were established with EU funds. These should be fully utilised to disseminate knowledge and know-how about the development of *telematics-based learning services*.
- b.) It is strongly recommended that better use is made of these existing networks by raising awareness of the potential of *telematic-based learning services* through the organisation of workshop briefings and the establishment of an effective mechanism for dissemination of knowledge and know-how through these networks.

c.) The generic networks like Euro Info Centres, Innovation Relay Centres have a particular role to play in disseminating knowledge and know-how in telematic-based learning services but are not directly involved in being specific learning networks.

d.) Therefore there is a need to actively promote networks which actually are involved directly with SMEs in knowledge transfer.

e.) It is recommended that a more effective mechanism is established for feeding the National Awareness Partners with more information concerning developments in *telematics-based learning services* in order to better utilise their expertise for exploitation of results.

f.) It is recommended that Science Park managers are better informed about the potential for the development of telematic based learning services. Many skills and expertise that exist within the Science Parks are likely to be very useful for the development of components which could lead to the development of services.

g.) It is recommended that a European directory of consultants interested in the development of *telematic-based learning services* should be established. Through a mailing list and electronic mail they can be "fed" information in this field. A first stage could be to set up a workshop to bring consultants from across Europe together.

h.) Because of the high turnover rates of personnel in SMEs encouraging the individual learner to remain associated with a training institution after taking a formal course to can encourage the development towards lifelong learning through the informal acquisition of knowledge.

## **5. Encouraging innovation transfer**

a.) The European Union's SPRINT Programme has ten years experience of stimulating the development of innovation and technology transfer. Although it may have had an impact on some companies including SMEs by encouraging them to be more aware and utilise more new technologies and processes within their core business, the techniques do not appear to have been used in the context to encouraging innovation within education and training.

b.) Encouraging the development of telematic-based learning services is clearly an innovation transfer process. There is an urgent need to look at existing techniques and test out "tools" which are already being used in other context within education and training.

c.) Innovation Networks in particular need to be made more aware of the potential for the development of *telematic-based learning services* as an economic growth sector. Innovation networks themselves should also be making use of telematics systems as a means to disseminate information.

d.) It is recommended that a more effective mechanism is established for feeding the Innovation Relay Centres with more information concerning developments in *telematics-based learning services* in order to better utilise their expertise for exploitation of results.

e.) Other Member States should look closely at the UK Business Links example with a view to developing similar approaches in their own countries. As a pilot a effective mechanism should be devised and tested to ensure that Business Links and in particular

their Innovation and Technology Counsellors are fully aware of the potential growth area in *telematic-based learning services*.

f.) There is a need to compile a databases of innovations (technologies and ideas) in the area of telematic-based learning which could be used by interested organisations

g.) There is a need to develop some innovation transfer diagnostic tools & methodologies to encourage the up-take of telematic-based learning services - target group training providers. A large body of knowledge and know-how already is available from other EU funded projects, there is a need to fully utilise this expertise when developing strategies towards encouraging SMEs to utilise telematics based systems for training.

h.) It is strongly recommended that a similar scheme to Technology Performance Financing should be tried out with encouraging the use of a particular types of *telematic-based learning services*.

## **6. Utilising mass media for training SMES**

a.) This study has not looked at the potential of mass media telecommunications systems like satellite and cable television. But, as new digital compression techniques start to become available and interactivity becomes a reality, there is a tremendous potential for producing cost effective training. As over 90% of SMEs are micro companies employing less than 10 employees mass production distance learning techniques may be the most appropriate method of reaching them. In fact it may be the only way of reaching large numbers of people working in SMEs

b.) Further research is needed into looking at "mass media and mass production" techniques aimed at reaching large numbers of SMEs. This should also be framed around the fact that often the employer of an SME is unwilling to pay for training as they fear that once trained the employee will move to another job.

c.) There is a need to encourage a culture of "individual responsibility for learning" leading to lifelong learning. Mass media could be extremely effective in encouraging this cultural change.

## **7. Dissemination of knowledge and know-how**

a.) Existing networks which already exist for SMEs should be better "fed" with information concerning the development of *telematic-based learning services* for all types of organisations including SMEs.

b.) There is a need to raise awareness that the development of *telematic-based learning services* not only can help to improve access to education and training, but that it can also be a major creator of new jobs requiring a wide variety of skills and has a huge potential for exporting to a world-wide market.

c.) There is also the need to encourage the "training provider" i.e. a university, further education college or other training organisation to "hold on" to their clients by offering informal methods of knowledge transfer to keep them up to date with the broad developments in their specific sector. At certain points the SME will be able to "dip into" more formal courses as and when appropriate.

d.) The generic networks like Chambers of Commerce, EIC and TECs, Banks and Business Links should be made more aware of the potential of telematic based learning services through being feed information like news releases giving real cases studies which they can incorporate into their own publications. However, it is critical that the examples given are appropriate. Currently there are very few really good examples around.

e.) A conference should be organised aimed at bringing together all this knowledge in order to stimulate new project proposals.

### **8 Establishing Exemplar Projects**

a.) There is a need to establish more exemplar projects particularly involving professional associations which will stimulate widespread adoption.

b.) It is highly recommended that professional associations across Europe are made more aware of the potential of *telematic-based learning services* and are encouraged to take part in pilot projects which test out these services amongst their members.

c.) A follow study is needed to produce a directory of projects which are utilising various EU Funding mechanisms and to identify "examples of good practice".



## Appendix A - Methodology Used for Collection of Data

Using the consortium's own established personal network of contacts as a starting point the study has been able to identify key networks across Europe including chambers of commerce, Euro Info Centres, Business and Innovation Centres, Science Parks, regional Technology Transfer centres RTCs, innovation networks, as well as many funding organisations, including the major banks, that promote technology transfer and training. Much effort has also been made to identify sources of funding for training other than government funding.

Early on in the study it became apparent that there were very few extensive, quality information sources for this study. In fact we have only identified two funding source databases other than information stored by ECHO. The two sources are the AIMS database owned by the European Policies Research Centre Ltd, Glasgow and ecuFinder database owned by ecuFinder Europe GmbH, Germany. The first of these had only 20 records relevant to our study. The later covered 8 countries (Austria, Belgium, France, Germany, Norway, Spain, Sweden, and UK) with approximately 4000 records of which 1200 were in the UK or EC funds. It must be noted that ecuFinder work closely with banks and the database is available on CD-ROM at typically £3000 per annum and is updated monthly. The database does cover a wide range of funding sources however there were no specific records relating to networks or funding for training.

To identify networks, telematic awareness, and funding sources a questionnaire was sent to each entry on the studies initial database. The questionnaire was developed in stages and trialed in the UK. It was refined by three iterations to get non-ambiguous questions that answered our studies requirements. Each phase was trialed with approximately 50 samples. The final questionnaire was translated into French (for Belgium and Luxembourg), German (for Austria), Italian, Portuguese, Spanish, and Greek. The English version was used with Denmark, Finland, Ireland, Iceland, Netherlands, Norway, Sweden, and UK.

The questionnaire aimed to answer the following questions

- If an organisation was a network that supports SMEs (e.g. Chambers of Commerce, professional association, trade associations, public authority etc.).
- If an organisation had any involvement in training SMEs, in particular using flexible and distance learning.
- If an organisation understood telematics-based training (e.g. the use of video-conferencing, electronic mail, computer based training).
- How training was funded and the sources of financial support available

Specifically the questions asked were as follows:

- How would you describe your organisation?
  - Network for SMEs*
  - Government Agent
  - Funder of Training
  - Training Provider



Business Consultant  
SME  
Other

- If your organisation is part of a *network for SMEs* what is the relationship between your organisation and the SMEs?
  - Network centre / organiser
  - Network member
  - Funding
  - Training
  - Business Advice
  - As a contractor / buyer
  - Other
- If your organisation is part of a *network* what is the size of the network?
  - Less than 20 members
  - Between 20 and 100 members
  - More than 100 members

Is the membership?

Local  
Regional  
National  
European

- Does your organisation use?
  - Flexible or distance learning
  - Telematics / Computer based training
- Does your network use?
  - Flexible or distance learning
  - Telematics / Computer based training
- If your organisation uses telematics, how is this done?
  - General business IT
  - Video conferencing
  - Electronic mail
  - Access to a remote database
  - Other
- How is your organisation's training funded?
  - Your own funds
  - Local funds
  - Regional funds
  - National funds
  - European Community funds
- How is your network's training funded?
  - Network funds
  - Local funds
  - Regional funds
  - National funds

## European Community funds

- Approximately how much does your organisation spend on training in a year?
  - Less than 10 000 ecu
  - Between 10 000 ecu and 100 000 ecu
  - Between 100 000 ecu and 1 M ecu
  - More than 1 M ecu
- Approximately how much does your network spend on training in a year?
  - Less than 10 000 ecu
  - Between 10 000 ecu and 100 000 ecu
  - Between 100 000 ecu and 1 M ecu
  - More than 1 M ecu

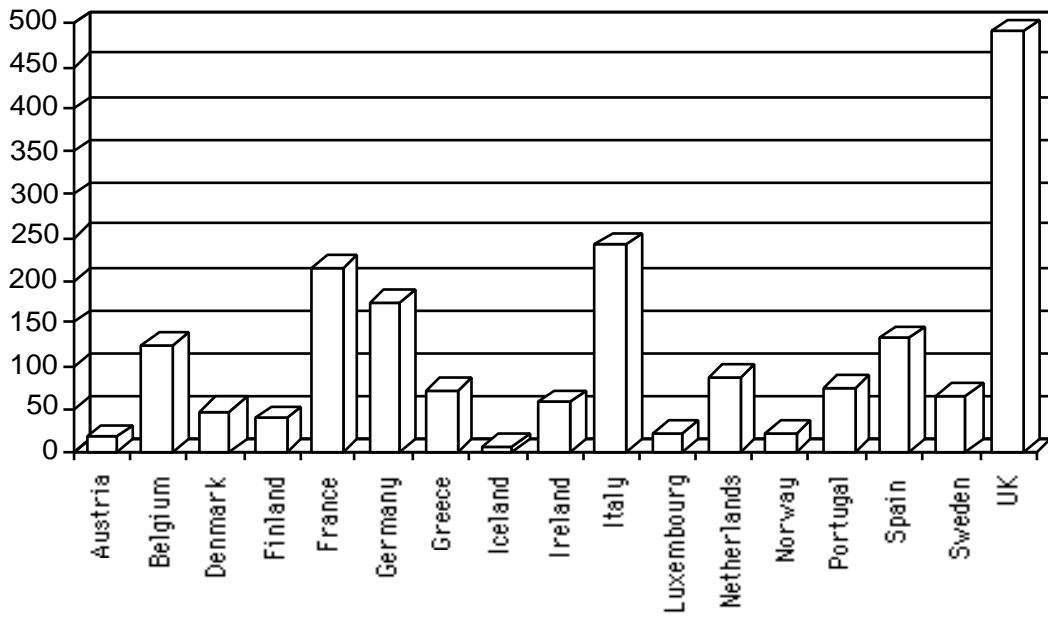
The final questionnaire was sent by fax to each of our initial 2400 database entries. Where the fax failed due to a change in number (of which there are many across Europe at this time) a letter and questionnaire was sent by post. The response rate and time was quite variable depending on country and organisation. The use of fax as the primary contact method proved to be successful in gaining a fast response from contacts and appears to be as effective as mail or telephone.

The database developed for this study has two elements: first a log of each contact, secondly a record of their answers to our questionnaire. The database has been developed on a cross platform database manager which is simple to update and export to other formats (e.g. World Wide Web format or CD-ROM). The database manager used was Claris Filemaker Pro 2.1, both Mac and PC versions. It has been converted to a Microsoft Excel format so that a wider range of data access tools can be used.

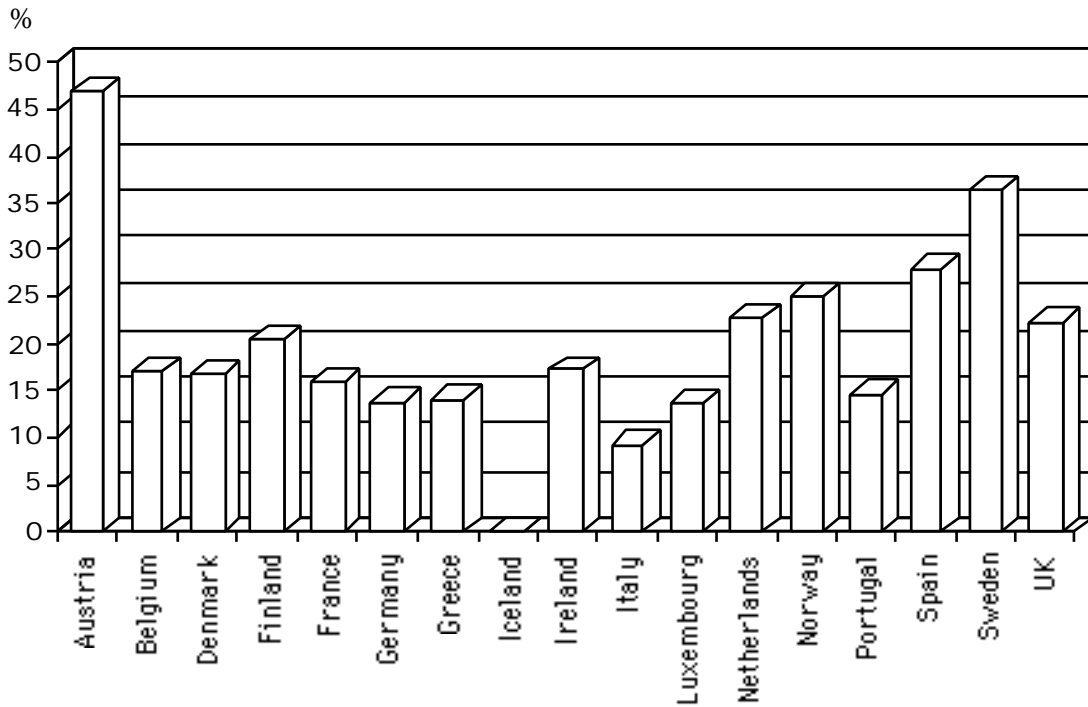
Each record has been updated in line with the information received. The database has been through several iterations of data pruning to remove duplicate entries (typically one organisation with two names), entries where two or more organisations with similar functions operating from the same address have been rationalised to one entry unless there is a clear separation of function. The organisations have been grouped or *typed* according to their function. This "typing" is based on the questionnaire response, the original data source or descriptions of the organisation. The objective is to be able to use the database to extract existing or potential networks.

After data pruning the number of separate organisations identified was reduced to 1886 with a response rate of 18.8% overall. This response varies from sector to sector and from country to country. The charts below shows these variation.

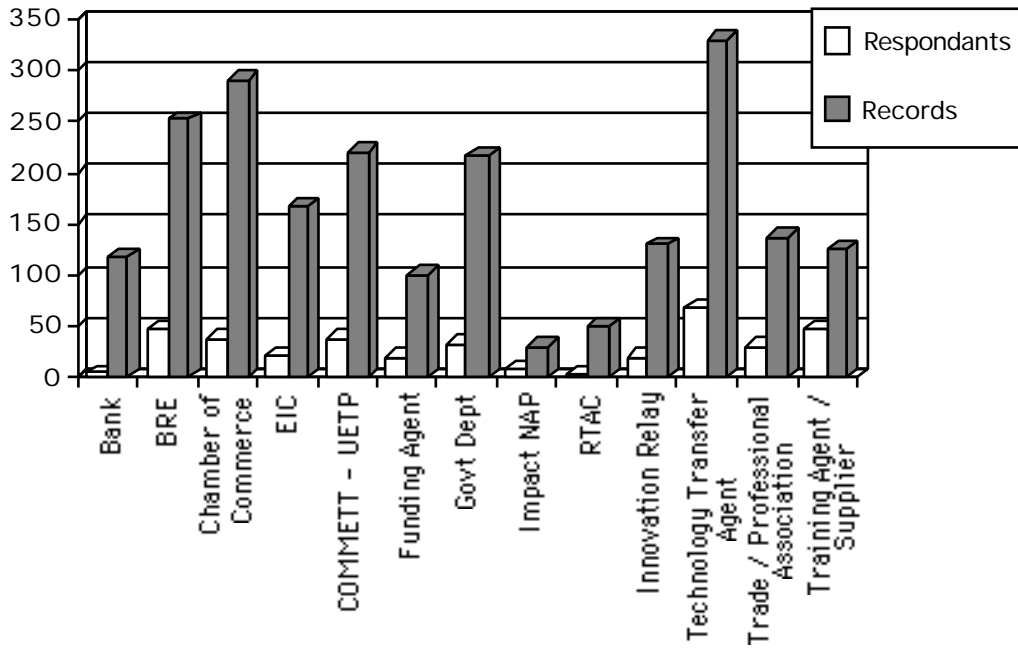
**Database Sample Size by Country**



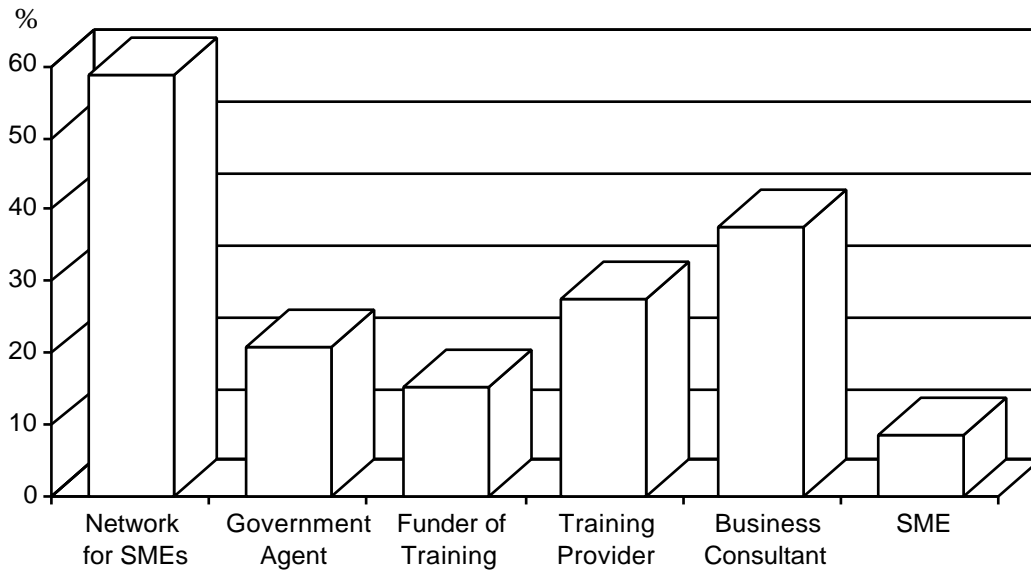
**Questionnaires Returned**



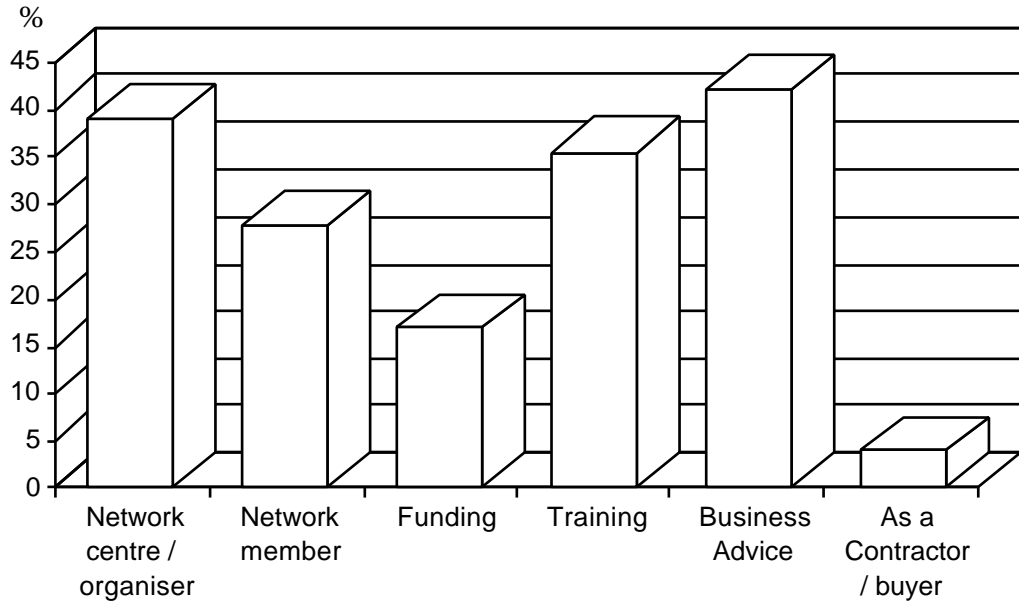
### Organisation Types and Questionnaire Response



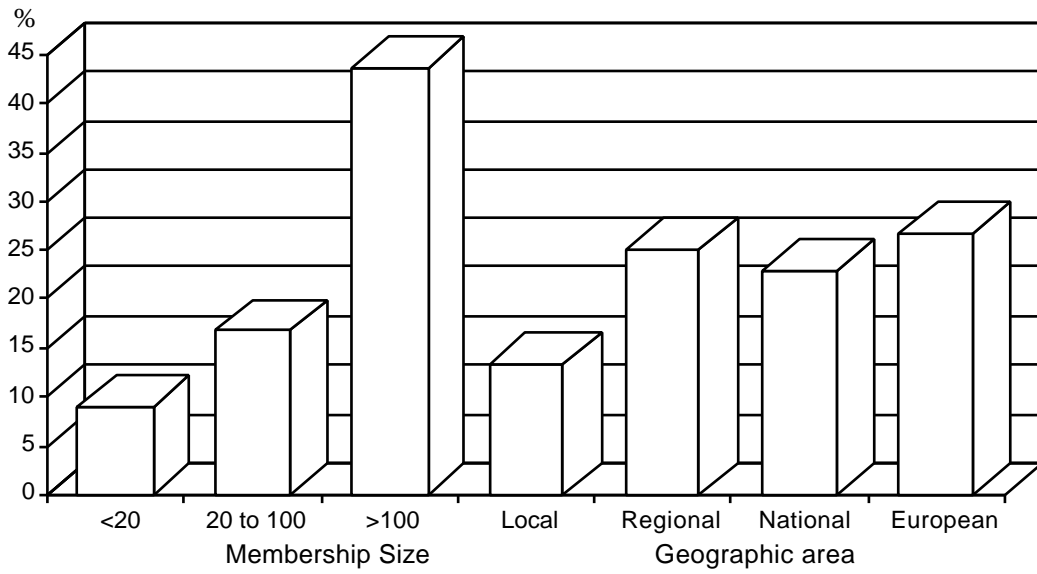
### Responding Organisations by Function



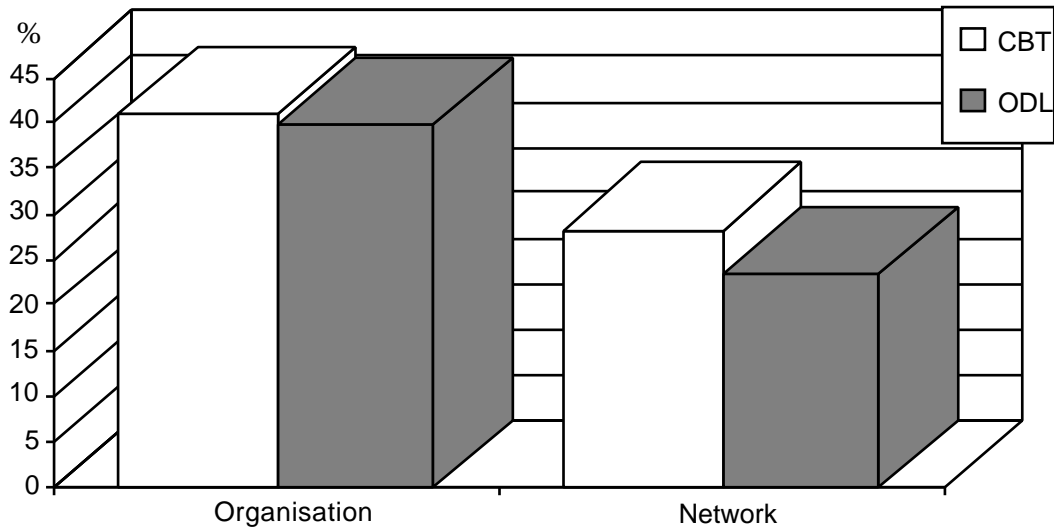
### Responding Organisations relationship with its Network



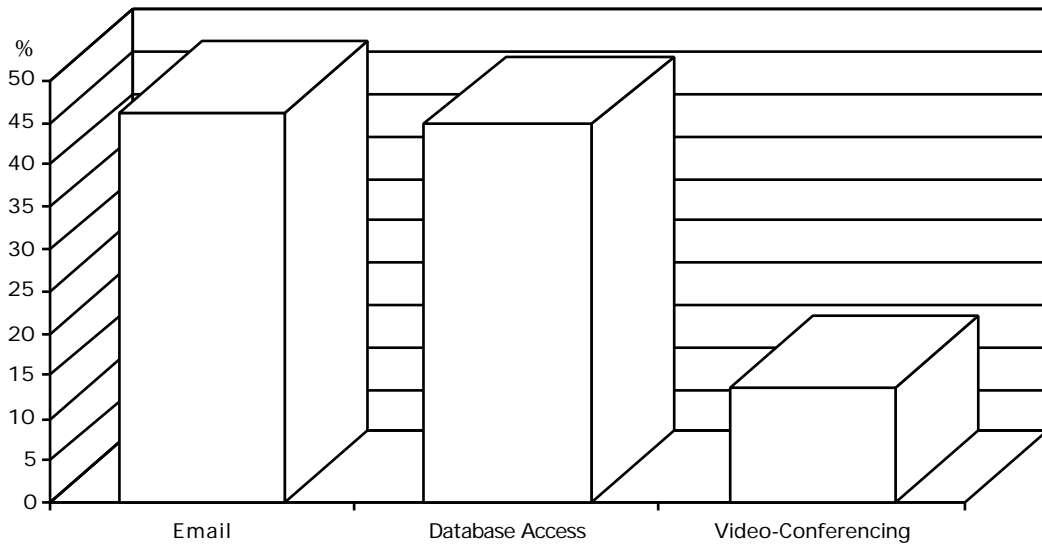
### Networks Size and Scope



### Respondants use of CBT and ODL



### Use of Telematics



In summary it can be seen that 46% of responding organisations were telematically aware since they use Email or remote databases. Some statistics of respondents are 59% were active in a network for SMEs, 39% were the co-ordinators of a network for SMEs, while 28% said they were members of a network. The respondents are representative most EU and EFTA countries (except Iceland) and formed a cross section of the database. In general the respondents appear to be early adopters of telematic technology with 14% using video conferencing and 41% using computer based training. The results are indicative of the types of organisations in the database and the assumption is that, with support, most networks and potential networks would become telematic users and promoters. Since these types of organisations are influential with SMEs there is a good chance of the SME network members taking up the technology as well as adopting a pro-training stance (35% of the networks surveyed trained).

## Appendix B - Directory of SME Networks

The Directory is attached to this report as a PC Format floppy disc containing two files, a FileMaker Pro v2.1 file and a Tab delimited export file. Both files are in PC format and can be run on a Apple Macintosh. The FileMaker Pro database is stored as a self extracting archive TET\_SME.EXE and the export file as SME\_EXP.TAB. To extract the database copy the files to a PC then run TET\_SME.EXE, this will produce the file TET\_SME.FM. You may then delete TET\_SME.EXE if you wish. Apple Macintosh users will need to extract the FileMaker Pro file on a PC, the TET\_SME.FM file will run on either platform. To run the FileMaker Pro database the computer will need a copy of FileMaker Pro v2 or later. The export file contains a duplicate copy of all data, and can be imported into any database as a single table.

The database includes all the valid contacts made and all questionnaire responses, as shown below.

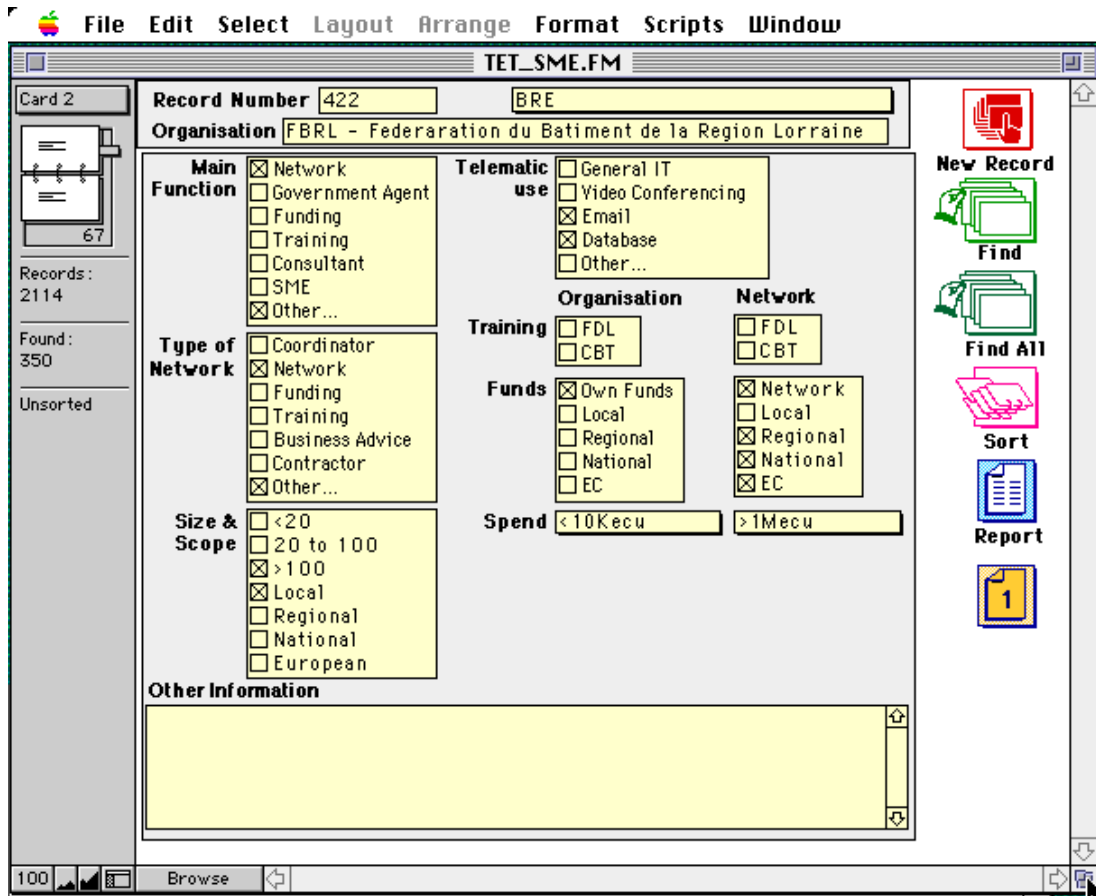
The screenshot shows a FileMaker Pro window titled 'TET\_SME.FM'. The menu bar includes 'File', 'Edit', 'Select', 'Layout', 'Arrange', 'Format', 'Scripts', and 'Window'. The window displays a record with the following fields:

- Record Number:** 422
- Date:** Fri, 31 Mar, 1995
- Q-Sent  Q-Return
- Organisation:** FBRL - Federaration du Batiment de la Region Lorraine
- Address:**
  - Street:** Rue de Metz 60
  - District:**
  - Town:** Nancy
  - Region:**
  - Postcode:** 54000
  - PO Box:**
  - Country:** France
- Tel 1:** +33 83 37 23 63
- Fax:** +33 83 37 49 08
- Tel 2:**
- E mail:**
- Contact Name:** M Philippe Grange
- Position:** Secrétaire Général
- Type:**

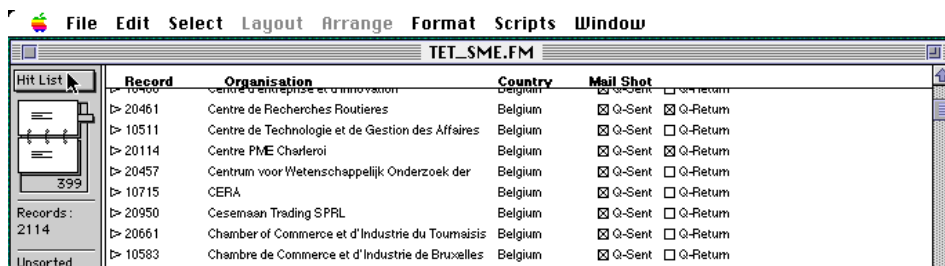
<input type="checkbox"/> Bank	<input type="checkbox"/> Govt Dept
<input type="checkbox"/> Chamber of Commerce	<input type="checkbox"/> Professional Association
<input type="checkbox"/> Consultant	<input type="checkbox"/> SME
<input type="checkbox"/> COMETT IC	<input type="checkbox"/> Trade Association
<input type="checkbox"/> COMETT UETP	<input type="checkbox"/> Training Agent
<input type="checkbox"/> BIC	<input type="checkbox"/> Technology Transfer
<input type="checkbox"/> BC NET	<input type="checkbox"/> VALUE Relay Centre
<input checked="" type="checkbox"/> BRE	<input type="checkbox"/> University
<input type="checkbox"/> Development Agent	<input type="checkbox"/> Impact NAP
<input type="checkbox"/> EBN	<input type="checkbox"/> Innovation Relay
<input type="checkbox"/> EIC	<input type="checkbox"/> RTAC
<input type="checkbox"/> Embassy	<input type="checkbox"/> Other...
<input type="checkbox"/> Funding Agent	

On the left side, there is a 'Card' view icon and a 'Records' list showing 2114 records, with 350 found and unsorted. On the right side, there are icons for 'New Record', 'Find', 'Find All', 'Sort', and 'Report'. At the bottom, there is a 'Browse' button and a status bar showing '100'.

The Questionnaire database form (Card 2) shown below is stored as a copy of the questionnaire sent to all contacts, the data entered is as the respondents indicated on the returned questionnaires. Data analysis can be carried out by searching the data or by using the export file with any appropriate statistical analysis package.



The data can also be displayed as a hit list, see below, or in several mailing label formats.





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