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TECHNOLOGY DEMONSTRATION AND APPLICATION CENTRES IN THE EU

EMPIRICAL SURVEY AND POLICY IMPLICATIONS

FINAL REPORT
AND
PROCEEDINGS OF EIMS POLICY WORKSHOP
LUXEMBOURG, 11-12 MAY 1995

BY

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EUROPEAN COMMISSION DG XIII D

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Foreword

The design, implementation and evaluation of policies promoting innovation and technology transfer have undergone a series of changes. In the 1970s policy was to a large extent an ad-hoc and judgmental process. However, during the 1980s policy changes became more informed and professional in outlook.

In order to continue this development, DG XIII / EIMS has carried out a number of state-of-the-art reviews in the field of innovation and technology transfer support. These so called "policy workshops" are mainly directed to public sector scheme managers and the aim is to discuss recent development in innovation policy, to exchange experience of best practice, to assess existing as well as future Community actions in these fields, and to discuss options for concerted actions.

This report (published in two volumes) presents the comprehensive survey and the workshop proceedings on the subject of **Technology Demonstration and Application Centres in the EU**. While the Executive Summary is reproduced in both volumes, the first (N° 14, Vol. 1/2) focuses on analysis, policy recommendations and the workshop discussion, the second (N° 14, Vol. 1/2) contains details of schemes at national level in the EU, the USA and Japan.

The two volumes are:

> Technology Demonstration and Application Centres in the EU
> Empirical Survey and Policy Implications, Final Report and Proceedings of EIMS Policy Workshop, Luxembourg 11-12 May 1995
> (EIMS Publication N° 14, Vol. 1/2)
>
> Technology Demonstration and Application Centres in the EU
> Country Reports EU, USA and Japan
> (EIMS Publication N° 14, Vol. 1/2)

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Technology Demonstration and Application Centres in the EU

Empirical Survey and Policy Implications

Executive Summary

for

CEC DG XIII - D 4

in the Framework of

SPRINT EIMS Project 94/71

Fraunhofer-Institute for Systems and Innovation Research (ISI), Karlsruhe (Co-ordination)

CM International (CM), Paris

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Objectives and Study Approach

In recent years a number of studies have gathered a considerable amount of information on the development of innovation supporting services and the ways and means of technology transfer. They have focused on consulting, training, information distribution, and the development of production processes as offered by research organisations (e.g. RTOs), university institutes, and private organisations. There is, however, a lack of information on the role that demonstration activities and in particular Technology Demonstration and Application Centres (TDAC) play in the process of technology transfer to SMEs. It was the objective of the EC funded study described in this paper to investigate TDACs in the EU in order to provide an understanding of the profile and function of these organisations and their demonstration activities and to analyse the results with a view towards policy implications. To discuss the results of the study with a larger audience of policy makers, TDAC managers, and other person involved with demonstration activities a workshop was arranged.

The work was carried out by a consortium of four research organisations from France, Germany, the Netherlands, and the United Kingdom. A questionnaire-based written survey supplemented by field interviews was used to gather information on TDACs and demonstration activities in twelve European countries. Only organisations which were expected to demonstrate technology in a neutral fashion were originally selected. A total of 411 TDACs were contacted by mail with 214 of them responding. In addition 94 interviews were conducted with TDAC managers, their clientele, and policy makers (concerned with TDAC affairs).

TDAC Profiles

Many of the TDACs have been founded within the last ten years. Only 30 % of the TDACs responding to the questionnaire had started demonstration activities before 1986.

A **typical TDAC** can be described as an organisation which:

- demonstrates new technologies and processes to public or private enterprises;
- offers additional services such as consulting, seminars/training, and testing/certification;
- uses systematic promotion for their services;
- has mainly small and medium sized clients;
- is neutral with regards to technology suppliers.

More than half of the TDACs are **part of a larger organisation** which in most cases is a private or public/semi-public research institute. Less than half of the TDACs have more than 25 **employees**.

Initial **funds for investment** came mainly from public sources with national support being the most common (in 129 reported cases); in 58 instances equipment suppliers also provided funding (equipment) and in 91 cases the organisation used some of their own funds. Public

funding (both core funding and through projects) amounts on the average to almost 45 % of the budget, the rest is made up of fees for services (about 35 %) and to a lesser degree from donations and other sources. Public **core funding has decreased** over the last 3 years in many instances whereas funds for public projects and income through fees have increased. 113 TDACs reported an **increase in turnover** over the last 3 years. Turnover remained about constant for 45 reported cases and decreased for just 20 of them.

About 50% of TDACs are sector oriented which means that they focus their demonstration efforts on a single sector. This proportion is much higher in Belgium, Spain and the Netherlands. The targeted sectors are generally traditional (wood industry, footwear, meat industry, foundry, etc.). **One third of TDACs are application / technology oriented.** For these centres the importance of demonstration is higher than for sector oriented TDACs. This proportion is much higher in Germany and somewhat higher in Ireland.

Manufacturing technologies and processes make up the most frequently quoted field, followed by information and communication technologies, materials, and environmental technologies (in that order).

To **demonstrate** their new technologies TDACs mainly use the **actual physical system** and in some cases a physical model of it. In addition (in some cases as the only means) some kind of media (e.g. computer simulation, video, picture boards) is used for demonstration purposes.

For the year 1993 more than ¾ of the TDACs reported having **less than 500 clients.** The majority of these clients (87 %) can be categorised as **small and medium sized enterprises (SMEs).** Most clients belong to the **secondary sector.** Although most clients are located within the region or nation almost 120 TDACs claimed that they had some **clients from foreign countries.**

Systematic **promotion** is done by the majority of the TDACs. The most commonly used methods to reach clients are direct mailing, participation in conferences, congresses, and trade fairs as well as publication (not advertisement) in relevant journals.

When asked to project into the future and predict **major bottlenecks and weaknesses** and major strengths and opportunities over the next 3 years, most TDACs expect to have some financing difficulties. This includes both financing personnel and obtaining money for equipment and facilities used for demonstrations. Other expected bottlenecks were the recruitment of staff and the attraction of new clients. Strategic development ranks first as a **major strength,** followed by the development of services complementing demonstration activities; attracting new clients; developing co-operations; and keeping pace with technological change.

Plans for the next few years include an increased client base, followed by increasing turnover and an increase in the use of EU programmes and subsidies. Increasing the number of technologies to be demonstrated was also an important goal for the next few years.

A **typology** is proposed for the TDACs within the European Union. Excluding 'weak definition TDACs' (demonstration is not a major activity) and 'pure demonstration centres' (which only provide demonstration in a strict sense) the following two classes were identified:

- **Development centres** (47%) - oriented towards non-mature technologies, which develop / adapt and demonstrate technologies, generally for a first time in avant-garde firms.
- **Integration centres** (32%) - generally oriented towards the demonstration of mature technologies and helping SMEs to efficiently integrate / use the new technology.).

Both integration and development centres are fairly well represented in each country. However, there is a dominance of integration centres in the Netherlands and Spain and of development centres in Belgium and Portugal.

TDAC Related Policies

Advanced technology demonstration policies in the EU can be roughly divided into **government programmes** which are usually initiated at the national level (as part of a broader technology specific policy) or which are non-technology specific technology transfer measures predominantly at the regional level, and **institutional (private) initiatives**. Initiation and continued funding for demonstration activities by national governments have focused on public and semi-private research organisations and universities (RTOs, TDACs, etc.). **Government support** ranges from initial funding of equipment and facilities up to and including funding of staff and demonstration activities. In some countries, such as Great Britain and Germany, direct support programmes for industry were also initiated. This includes the *Inside UK Enterprises* (IUKE) programme in Great Britain and the *'Technologie-orientiertes Besuchs- und Informationsprogramm'* (TOP) in Germany. In other countries, such as the Netherlands and Denmark, firms were given financial support to adopt new technologies and processes on the condition that they in turn demonstrate these to interested firms.

At the **institutional level** both private and public research institutions and universities have taken their own initiatives to demonstrate new technologies and processes. For some institutions this is done to support their own research and to promote the results of their work. In several cases the objective is to demonstrate their know-how and competence by providing neutral demonstration and information on new technologies and processes for SMEs. This way of launching TDACs is characterised by the directing of their own funds to demonstration activities. However, in many cases these funds originate from public sources as well.

Within the EU **support** to TDACs by national governments **varies from country to country.** In Germany the Federal Government has supported demonstration activities in TDACs for more than a decade and is currently concentrating on the 'Neue Bundesländer.' In Southern European countries, such as Italy, the government is contemplating the initiation of programmes for demonstration activities.

Main Issues

A comprehensive analysis of the TDAC survey and interview results led to the identification of a number of major aspects concerning TDAC strategies, their role within the technology innovation and transfer activities, and the assessment of their activities.

- *Range and Integration of Services in TDACs.* The demonstration of technologies and their application possibilities alone do not provide a sufficient basis for a TDAC. Thus demonstration is very seldom the only activity of TDACs. Although 40% of the responding TDACs reported demonstration as an activity of major importance, the interviews showed that demonstration activities are in general complementary actions to support the main objectives of the organisation. A range of **integrated services** is being offered by most of the TDACs identified. Services such as the assistance of firms not only in selecting a suitable technology but also during the planning and implementation phases are indicative of the integration oriented characteristics of the support offered.
- *Promotion of TDAC Services.* One of the important issues for TDACs is the attraction of a sufficient number of clients. To meet their goals most of the surveyed TDACs promote their activities in a systematic way. Active promotion appears to be necessary as small enterprises are especially difficult to reach and attract. There is some reluctance in firms to approach organisations or institutions which are associated with high level research institutes. Promotion has to convince potential clients that TDACs will assist them with their day-to-day technical problems and that they as actual users will benefit from the new technology. There was some concern by clients about a lack of transparency/visibility of the TDAC activities. It should become clear to clients how they can benefit from the new technology.
- *Appropriateness of Technology, Application, and Sector Oriented Strategies.* The study has shown that the distinction made between technology and application oriented TDACs on the one hand and sector oriented TDACs on the other hand formed an appropriate criterion for a basic categorisation of the institutions. The three organisational types can ideally be related to the technology life cycle. In the early phase of technology diffusion technology oriented TDACs are the appropriate institution for the demonstration. During the increasing diffusion of technology application oriented TDACs, which focus their activities on services beyond the mere demonstration of a technology, seem to be the appropriate organisation. In the late phase of technology diffusion, when questions of

broad distribution and promotion of structural changes become important, sector oriented TDACs seem to be more adequate.

- *The Management of Change.* The development of TDACs, especially of the technology-centred ones, is closely linked with the pattern of diffusion of the particular technology in the nation's economy. As a result of the strong links with the extent and speed of technology diffusion, TDACs must be in the position to adjust or transform themselves regarding their function in the national innovation system, the services they offer, target group(s), their mode of addressing customers, necessary qualifications, etc. If this process is accompanied by a steady cut-back in public support, then the TDACs are also faced with the challenge of guaranteeing the continuation of the institution by securing adequate liquidity.
- *The Assessment of TDAC Performance.* The performance of a TDAC and the assessment of its success is largely dependent on the mission or goals of the centre. The objectives of a TDAC will vary depending on the role it plays in the diffusion of technology. The measurement of a TDAC's performance is thus complex and difficult to perform. It is generally not practised by TDACs at this time. This does not mean that TDAC managers and policy makers do not evaluate at all the success of a TDAC's operation, but that the criteria used are only indicative of directly measurable factors. Factors which are more tangible and difficult to measure and especially which are related to clients' needs and requirements, have up to now only rarely been used to assess TDACs. Particularly among policy makers there is some dissatisfaction about the approaches and instruments available to assess the success and performance of TDACs.
- *Regional Orientation in TDAC Establishment.* Initiatives for the establishment of TDACs started in some countries (e.g. Germany and France) on a regional level. Regional government (sometimes supported by some policies of the national government) and local institutions saw a demand for activities which would improve technology transfer to local or regional enterprises or institutions. These activities concentrated on technologies relevant to the industry or the characteristics of the region. A crucial point in regionalisation of TDACs is the degree of specialisation achievable and the critical mass of customers in advanced technology fields.
- *Demand Assessment and Demand Orientation.* The establishment and operation of TDACs have in the past been mainly supply oriented. The scope of the services offered and the type of technology demonstration and technology transfer are based primarily on assumptions and not on reliable information on the actual needs of the potential customers. Not one case could be identified in which the demand potential for TDAC services or the potential target groups as well as their need for information and their information behaviour patterns had been studied. This strong supply orientation has impacts on the demand for TDAC services and the use of demonstration centres. This applies above all to technology-centred TDACs and those which are organisationally linked with research or university institutions.

- *The Timing and Integration of Technology Demonstration in the Context of Broader Technology Programmes.* The effectiveness of TDACs within the national innovation system is influenced by two factors in particular: the timing of the launch of technology demonstration and application activities in relation to the diffusion and degree of maturity of the technology in question, and the conceptional and chronological co-ordination of state promotion measures for TDACs with other technology policy measures (e.g. for the diffusion of certain technologies). Besides the degree of maturity of the technology demonstrated in TDACs, the conceptional and chronological co-ordination of state support for TDACs with other national and even regional technology policy measures is of great importance to the effectiveness of demonstration centres.

Policy Implications

The results of the study have shown that TDACs with their demonstration activities form a stand-alone institution in the range of technology transfer bodies and can play an important part in an overall strategy of technology and innovation transfer. TDACs have focused their actions on SMEs and have succeeded in attracting a clientele mainly from small. They have thus at least partly succeeded in addressing enterprises which traditionally are a major but difficult target group of technology transfer processes. These enterprises in fact appreciate the TDACs in particular for their skills in monitoring technologies, their neutrality, their usefulness during the feasibility-adaptation phase and their reasonable cost.

The following policy issues were identified in the study and presented with possible actions to be taken at the European level. Some of the measures discussed are suitable for application at both the national and the European level.

- *Networking.* The study has revealed that although there is some exchange of information between TDACs at the national level and also to a lesser degree at the European level, no systematic activity to share experience or know-how could be identified. International activities, as the study showed, are of interest to TDACs and should be further developed. An idea would be a European exchange programme for TDACs which could not only extend demonstration activities and promote technology transfer across regional and national boundaries but would also provide an excellent way to exchange experiences between TDAC management and staff. The exchange programmes should be supplemented by periodic seminars or workshops providing a platform for the discussion of relevant issues not only for TDAC managers but also leading actors from other demonstration and technology transfer actions.
- *Promotion/Marketing.* The awareness of TDACs and their services is a prerequisite for the subsequent use by SMEs. Promotion of their activities is thus a very important issue for TDACs. The mission of most TDACs is to focus their activities on SMEs as a target group.

It is, however, a difficult task to convince small enterprises that the technologies demonstrated are not only for large firms but that the TDAC services offered are especially tailored to meet the needs and requirements of SMEs. Best practices have to be identified or developed to be employed by all TDACs. This could be a field for actions on a European level in two directions: to generate awareness of TDAC activities and to develop and initiate best practice promotion methods. Support from the European Commission in this area will be especially important as awareness campaigns on a European level under the patronage of the EC have more leverage and will reach larger target groups in all regions of the EU.

- *Orientation to Client Demand.* Generally TDACs were established and managed based on a supply-oriented strategy. There often is little known about the demand side of demonstration activities and services offered. Questions like 'How much information do companies need?' or 'What kind of information are firms looking for?' have not really been answered. Ways to remove this deficit especially before the establishment but also during the active phase of TDACs have to be analysed and solutions developed. The integration of these procedures in technology transfer policies should be a goal both at the national and the EU level.
- *Evaluation and Performance Assessment.* Evaluation of a TDAC with respect to its effectiveness within a technology transfer and innovation policy is very difficult and as of today has generally not been undertaken by TDAC's management or public bodies. On the other hand it is important for policy makers to have a reliable and comparative information in order to rate and compare the performance of TDACs with other institutional measures. Due to the diversity of TDACs (in their missions, strategies, etc.) evaluation criteria will be quite complex. A crucial aspect is the impact on industry and therefore current and potential customers have to be considered in any approach or methodology. The evaluation of TDACs is not only a national objective but is of importance to all members of the EU. A joint action could thus be appropriate.
- *Further Development of Technology Demonstration Policies within the EU.* A survey of national demonstration policies and interviews with policy makers has shown that some form of government support has been given to TDACs in the past in almost all EU countries (and also in Japan and the USA) which implies that policies have existed for demonstration activities respectively that different technology programmes have partly referred to demonstration as a means of technology transfer. These actions have, however, in general been rather isolated and focused on particular technologies. A comprehensive concept of the role of technology demonstration in technology (transfer) policy is largely missing. Complementary to the policy actions proposed above the European Union could play an important role in the co-ordination of the national (and even regional) demonstration policy actions within the EU. It is necessary to realise that demonstration activities are an

important part in the chain of technology transfer and innovation support instruments available and as such should form an explicit element in technology policy.

TDAC Workshop

A two day workshop on demonstration activities as part of technology transfer and innovation policies was organised by the Commission and the FhG-ISI in Luxembourg on May 11th and 12th. More than 40 participants and speakers exchanged their experience with demonstration activities. In addition to TDACs as one demonstration facet several schemes of technology demonstration via company visiting programmes were introduced and their merits discussed.

It was found that experience with demonstration activities supported the main results of the study. It was made clear that demonstration is not restricted to TDACs. Demonstration has to be understood as a function which can be part of a variety of programmes for technology transfer. General agreement existed on the role of demonstration as an important part of technology transfer and innovation measures. Demonstration, both within TDACs and as part of other programmes. is an excellent means to reach small and medium sized firms.

Examples of TDACs within the EU were presented. They also exemplified the differences in public policies within the EU. In addition an overview of the current situation in Japan and the USA was given. An important feature of demonstration activities (especially also of TDACs) is the neutrality of the service. This increases the trust particularly of small firms (which can be reached by this activity) in these centres and eases their problem of minimising the risk involved in changing to new technologies and organisational forms. The complementary form of demonstration to other technology transfer related service was also stressed. Possibly because of the variety of structures and policy measures in this area it was not possible to come up with a single recommendation to policy makers. Instead it was felt that additional research should be done on a number of aspects such as the assessment of the impact, the cost effectiveness, and the market demand.

Technology Demonstration and Application Centres in the EU

Empirical Survey and Policy Implications

Final Report

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CEC DG XIII - D 4

in the Framework of

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Fraunhofer-Institute for Systems and Innovation Research (ISI), Karlsruhe (Coordination)

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1 INTRODUCTION

The innovation capacity of a nation's economy depends on many factors; public policy in the field of innovation support is one of the important macroeconomic factors. Within the Community, the policy support of innovation varies not only across European Member States, but also from region to region within Member States. These differences in the basic strategy, in the resources allocated, in the promotional instruments and in the implementation structure applied, reflect both differences in regional and national innovation capabilities, and differences in experiences in developing and implementing efficient policies. Based mainly around public innovation policies, but also as a result of private activities, technology transfer infrastructure and measures form an important part of national systems of innovation in Europe.

In recent years a number of studies have gathered a considerable amount of information on the development of innovation supporting services and the ways and means of technology transfer, for example, within the context of the European Innovation Monitoring System (EIMS) in the SPRINT programme. They have focused on consulting, training, information distribution, and the development of products and processes as offered by public and semi-public research and technology organisations (RTOs), university institutes, and private bodies. Surveys show that a great variety of transfer bodies exist. What is transferred takes one of many forms (tangible and intangible). Technology transfer is not an instantaneous event but a time-based process. An interactive model for technology transfer is emerging[1].

There is, however, a lack of information concerning the role that demonstration activities play in the diffusion of new technologies and in the process of technology transfer, in particular, as such activities have been increasingly institutionalised in the form of Technology Demonstration and Application Centres (TDAC) throughout Europe in the last decade. Compared to related institutions like technology centres or technology transfer centres the characteristic of TDACs is a combination of providing information about, advice on and demonstrating new technologies.

Based on this background, the European Commission, as part of a wider research programme under EIMS in the framework of the SPRINT programme of DG XIII, launched the study on Technology Demonstration and Application Centres on which this report is based.

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1 cf. Bessant: J./Rush, H.: Building bridges for innovation: the role of consultants in technology transfer. Research Policy 24 (1995) 97-114.

1.1 Aims and Objectives of the Study

Given the limited knowledge of the distribution and characteristics of TDACs (and technology demonstration in general) on a European scale the major goal of the study was to provide an overview of the state of establishment, and use of TDACs in the Member States of the European Union. In addition, the aim was also:

- to provide an understanding of the profile and function of TDACs,
- to investigate national and technology-based differences in the European Union,
- to evaluate the role and significance of TDACs in the overall innovation process and as a factor in the economic and technical performance of European industry.

The study should also provide an overview of current policies and show policy options. The study was therefore closely connected with the preparation of a workshop to exchange experience of best practice in TDAC management and policy and to discuss existing as well as future, community action in this field. A more detailed overview of the study objectives is given in Table 1-1.

Table 1-1: Objectives and Main Questions to Be Addressed in the Study

OBJECTIVES	ANSWER TO FOLLOWING QUESTIONS
Mapping	• Definition of TDAC • Description of TDACs: number, size, staff, country distribution, industrial sectors addressed, technologies offered, range of services provided for clients; outline of their organisational background (e.g. host organisations, funding structures) and co-operation between TDACs • Setting up of a typology
Role	• Rationale for TDACs • Role in the context of the dynamics of innovation, diffusion and technology transfer at sectoral and regional level • Success of TDACs in providing innovation services
Performance	• Assess the demand • Are specific needs of SMEs met? • Are there technologies or fields of application which are more appropriate for diffusion via TDACs?

Management	• What are the specific problems of TDACs? • What methodologies are used to make ex-ante assessment of demand? • What tools and methodologies are used to define activities, strategies, and role?
Public Policy	• Place of TDACs in national technology transfer systems • Are there alternative strategies to TDACs pursued by industrial firms or promoted by governments? • Role of public authorities/sponsors for funding, strategy or services

1.2 Study Design

In order to fulfil the tasks of the study a consortium of four research organisations under the co-ordination of FhG-ISI was set up. All partners contributed to the conceptual and methodological framework. The study therefore covered all twelve Member States of the European Union. The partners and their responsibilities with respect to country investigations were:

- Fraunhofer-Institute for Systems and Innovation Research (ISI), Karlsruhe: Germany, Denmark
- CM International (CM), Paris: France, Italy, Spain, Portugal, Belgium/Luxembourg and Greece (with the co-operation of national partners)
- Centre for Technology and Policy Studies (TNO), Apeldoorn: Netherlands
- Technopolis Ltd., Brighton: United Kingdom, Ireland.

In addition, a sub-contract was given to Philip Shapira of Georgia Tech University, United States, in order to provide an overview of technology demonstration activities in the United States and Japan.

This study has been carried out in four major steps (Figure 1-1). The first step included the collection and screening of documents and literature related to technology demonstration, the elaboration of a working definition of TDACs and the identification and collection of a list of potential TDACs. This formed the basis for the second, empirical step. A written survey based on a common questionnaire supplemented by field interviews was used to

gather relevant information on TDACs and demonstration activities. A total of 411 TDACs were contacted by mail with 214 of them responding (Table 1-2). However, neither the first nor the second figure should be mistaken for the actual number of TDACs in Europe. On the one hand, throughout the course of the project the initial list was complemented to some degree, on the other, the response to the questionnaires indicated that a significant share of the initially identified 'TDACs' did not meet the definition applied in this study (and did not therefore answer them). A realistic guess would be a total of 200 to 300 TDACs in the European Union in 1994.

Among those organisations, which in the written survey, showed a high relevance of technology demonstration in their range of services offered, 44 TDACs were selected for interviews. The selection ensured a balance and coverage of different types of TDAC with respect to their orientation towards a sector, an application, or a technology, as well as the different technology fields concerned by the demonstration. In addition, care was taken that TDACs from different regions of a country were included. The interviews with TDAC managers were complemented by 26 interviews with client firms and 24 interviews with policy makers concerned with technology transfer and technology demonstration matters. Each of the three types of interviews was guided by a specific set of discussion points and questions common to all countries.

In the third project phase, based on these informations, national and technology-based differences were identified, TDACs were classified and the role of demonstration activities was evaluated. The fourth and last phase analysed policy recommendations and their discussions with TDAC managers and policy makers. In this context the parallel two-day policy workshop plays an important role. This workshop is based on a separate contract but builds on this present report and will equally be documented in an appropriate way.

Figure 1-1: Study Design

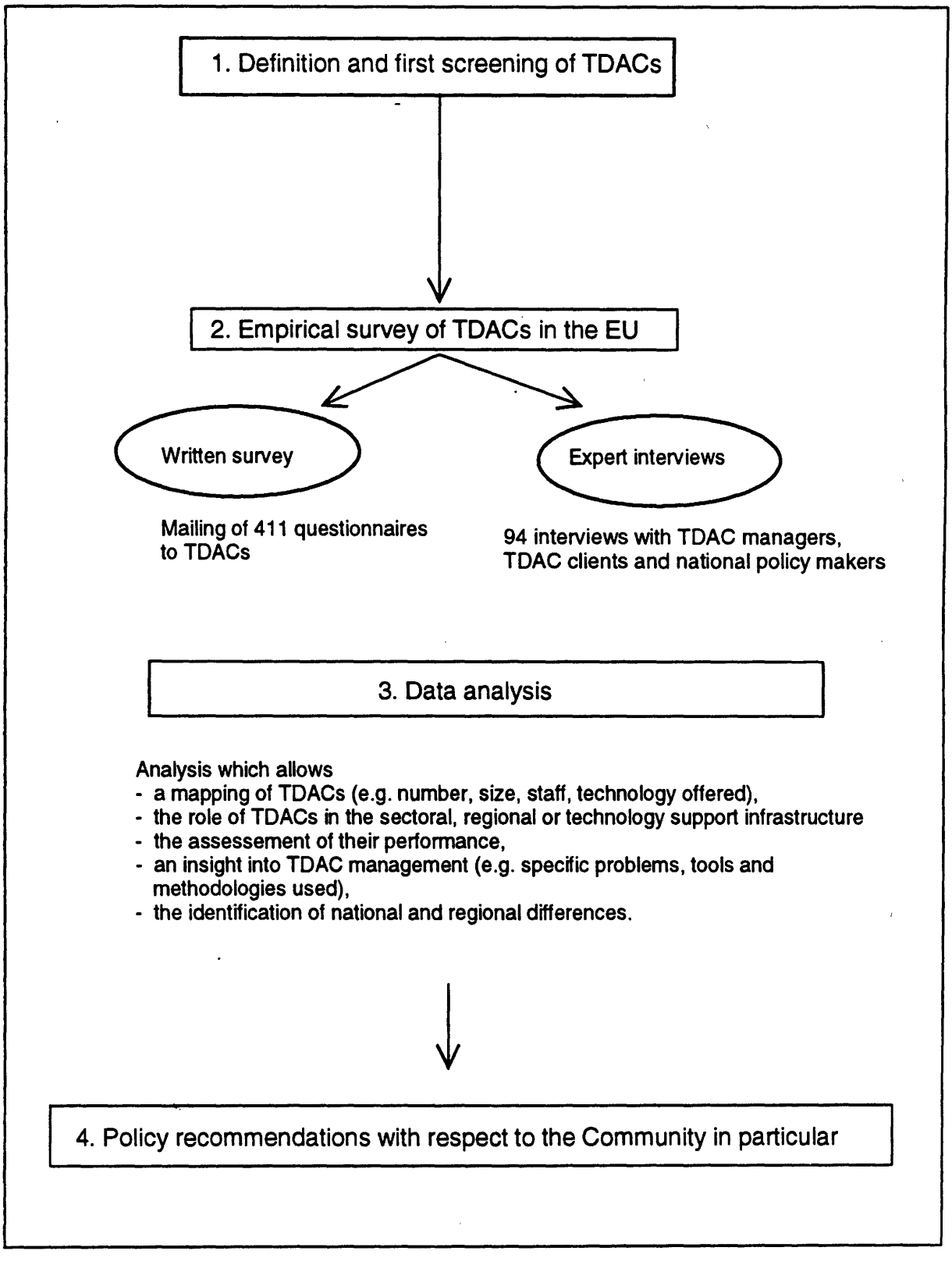


Table 1-2: Mailings and Responses of the Questionnaire Survey

Country	mailed	returned
Belgium/Luxembourg	25	12
Denmark	14	5
France	63	28
Germany	75	48
Greece*	9	9
Ireland	28	18
Italy	17	11
Netherlands	16	11
Portugal	40	18
Spain	37	16
United Kingdom	80	38
Total	411	214

* Greek TDACs were all contacted by phone and the questionnaire completed in face-to-face interviews

1.3 Content of the Report

This report presents the major results of the study and provides some initial policy recommendations at the European Union level. Besides the EU-wide analysis of the written survey, this report is based on country reports which came under the responsibility of the partners who carried out the research in their respective countries. These reports are documented in Volume 2 and include a list of the TDACs identified in the respective country. They also present examples of TDACs. These empirically based European reports are complemented by reports of the situation in the USA and Japan based mainly on desk research. An overview of public programmes including technology demonstration related activities in the Member States completes Annex A.

The summary report comprises three main sections. The first section consists of an overview of technology demonstration and TDAC related initiatives in the Member States.

The second section is largely descriptive and presents an overview of technology demonstration activities in the European Union and the distribution and profiles of TDACs. It starts with a discussion of the definition of Technology Demonstration and Application

Centres (TDAC) as it was developed for the purpose (and confirmed in the course) of the study. An outline of the evolution of TDACs is given next. Additional general information on TDACs includes:

- location
- in which sector or technology field they work,
- what kind and combination of services they offer,
- how they are organised and financed.

This is complemented by a look into TDAC management practices, problems, and perspectives. The attempt to develop a typology of TDACs and the presentation of public policies concerning technology demonstration and the establishment of TDACs concludes the descriptive section.

The third section is more analytical. Using the results from the survey and the interviews as well as the literature and document analysis, main issues of the establishment, organisation, development, management, and promotion of TDACs and technology demonstration in general are discussed. This concludes with a set of policy recommendations and perspectives, with particular emphasis on the role of the European Commission.

2 TDAC Initiatives in Europe

The approach and extent of technology demonstration and application activities are part of the national innovation infrastructure in each economy. It is furthermore assumed that they play an important role in the diffusion of new technologies as well as with respect to the innovation capacity of nations. Many European countries, therefore, support the demonstration of new technologies. As the analysis of the TDAC-supporting policies in Europe shows, there are differences concerning approaches and the extent of technology demonstration and application activities not only across Member States, but also from region to region within Member States. The various demonstration activities can be divided into two groups (Table 2-1):

- those from public initiative and with direct financial support from public authorities,
- those from private initiatives and outside of particular public programmes.

Table 2-1: Originating of Technology Demonstration Activities in the European Union

Country	Activities based on public schemes and measures*		Activities based on non-public initiative
	within specific „techno-logy push" programmes	within the framework of general technology transfer programmes	
Belgium	not relevant	not relevant	important
Denmark	not relevant	not relevant	important
France	exist	exist	exist
Germany	important	exist	exist
Great Britain	exist	important	not relevant
Greece	not relevant	exist	exist
Ireland	exist	exist	not relevant
Italy	important	exist	exist
Netherlands	not relevant	important	exist
Portugal	not relevant	important	exist
Spain	not relevant	exist	important

* See also Annex B

2.1 Types of Initiatives

2.1.1 Activities Based on Public Schemes and Measures

Within the first group, the demonstration activities are generally financed either within technology-push-programmes for the diffusion of a specific technology or within other policy measures (e.g. general technology transfer or training schemes). Annex A provides an overview of public policy measures in the field of technology demonstration and application within the European Union. One can identify differences between the political actors, the recipients, and the kind of funding.

- *Political actors:* Public support for technology demonstration is given by various political actors. It ranges from supranational and national level to state and regional level. In some cases there is more than one political actor engaged at the same time, but often the main share is with the national government.

- *Recipients:* Public support is always given to the suppliers of technology demonstration and application services. Three supplier groups could roughly be identified:
  - -- Institutions whose major business is technology demonstration (TDAC in a narrow sense). They are mainly publicly funded.
  - -- Public or semi-public research institutions or universities which in addition to their main business of research, development or education offer technology demonstration services. Sometimes they receive grants from government for expanding or supplementing their main business.
  - -- Firms which demonstrate the usage of new technologies to other firms. For inviting other firms and sharing their experience they are offered financial incentives. To be effective, the firm-to-firm demonstration requires that the technology already benefits from a wide diffusion in the country.

- *Type and amount of funding:* Public financial support of demonstration activities ranges from subsides towards initial investments for equipment or personnel to the coverage of the total costs during the first years of operation.

2.1.2 Activities Based on Non-public Initiatives

Although setting up and developing the national innovation infrastructure lies generally within the responsibility of the government, there are, in some cases (in addition to or as a substitute for public support), non-public initiatives which offer similar services. 'Non-public' in this case means that the offer of demonstration services is not based on a political mission but on individual reasons; demonstration activities are, for example, established to promote other activities or work. Demonstration is believed to help private or public research institutes or universities to acquire research contracts or promote the diffusion of research results. It is also used to demonstrate own technological know-how or consulting competence in a specific field. Besides a number of research institutions there are also private companies, associations of companies or chambers of commerce and industry initiating and offering technology demonstration services. The 'non-public' initiatives are mostly financed by the regular budget of public institutions respectively non-public institutions or from the own funds. In most cases therefore, a certain level of public funding is involved. However, different from public initiatives, it is up to the public institution to decide how to use their allocated budget. The subsequent use of this budget for demonstration instead of other activities characterises the establishment of TDACs.

2.2 Public Support in the Member States

The table in Annex A provides an overview of schemes involving technology demonstration in the EU Member States. In the following a more general description of each country is given. However, given the focus of the study on the state of the art in technology demonstration and TDACs in particular, this cannot be comprehensive.

Belgium

In Belgium, technology transfer is mainly based on research centres, which are key elements of the national government's technology policy. One third of their activities can be considered as activities of technology demonstration concerned with the diffusion of the results of publicly supported R&D-projects to enterprises. Beyond this there is no specific action or policy in Belgium for demonstration activities, neither on the national government level (especially the Ministers of Industry and Research) nor on the regional level.

Denmark

During the mid eighties, a technology development programme was launched in Denmark by the National Government. A small part of this was intended for demonstration projects

as firms could apply for financial support if they agreed to demonstrate the results of their projects dealing with the implementation and use of new technologies. Some broader demonstration activities were started by publicly supported research institutes. Today demonstration activities are no longer part of Danish measures to promote technological innovations. The only active demonstrations are those of a few technical institutes based on their own initiatives. The reason for no longer supporting TDACs is mainly due to a change in policies as the priorities have transferred to the importation and dissemination of knowledge to Danish industry from abroad.

France

In France, technology demonstration activities form only a part of the total activities of technology transfer bodies, but, in general, it is these activities that give the body its reputation and positioning within the technology transfer infrastructure. For certain regions (e.g. Lorraine) the technological support offered to SMEs includes the development of real technological platforms often equipped with technological demonstration activities. French national policy makers - the Ministry of Industry and the Ministry of Research - are quite reluctant to encourage technological demonstration activities because they are in doubt whether there is a client demand for new products or new technologies. In spite of this, however, they do engage in some activities of communicating industrial experiences of new processes or technologies (via press meetings in particular).

Germany

In Germany, the innovation infrastructure is extremely varied, due to the federal structure and also to the wide support for different technology fields on a national and even regional level. The concept of technology transfer has been of increasing importance since the beginning of the eighties. In the course of differentiating technology policy in the mid eighties, the demonstration of new technologies gained independent importance among the different instruments for technology transfer. In the framework of the technology-specific promotion programmes of the Federal Ministry of Science and Technology, partly complemented by support from the states (Länder), funds were provided for the setting-up (machines and apparatus) and, for a limited time, the operation (personnel and running costs) of demonstration centres. These were awarded primarily to existing, relevant research institutions. Besides this, the Federal Ministry of Economic Affairs supports a company-visiting programme (TOP), aimed at firm-to-firm technology demonstration. Some support is also given from state governments as part of their programmes for technology transfer.

United Kingdom

Historically in the UK, the largest area of expenditure has been in the field of technology development. Many of the technology demonstration activities which occur within institutions located in the UK technological infrastructure arise as a result of project funding of this nature. In the large part they are incidental activities and not the primary focus of the project. There is no formal or direct public support for technology demonstration activities in the TDAC population and consequently there are no public mechanisms in place to assess the scope, scale, nature, efficiency, effectiveness and impact of technology demonstration activities in RTOs and similar organisations.

Public support for technology demonstration activities does not exist, though the focal points for the activity are private sector firms rather than TDACs within RTOs. The main mechanism is the Inside UK Enterprise Scheme (IUKE) sponsored by the UK Department of Trade and Industry (DTI) which provides an opportunity for UK firms to visit leading companies employing best management practices in a wide range of product areas. Generally technology transfer and diffusion, and technology demonstration in the UK is starting to receive more attention as one possible mechanism to stimulate diffusion in a more co-ordinated fashion.

Greece

In Greece, as one of the less favoured regions in Europe, development and diffusion of new technologies cannot be demand driven. Therefore the government has taken several initiatives to promote a supply push model, based initially more on R&D and less on innovation and technology transfer policies. Within the national technology transfer structure, which is based on sectoral research institutions, demonstration could not be identified as a major function in any of the institutions. Policy makers consider demonstration activities as part of the plans of each unit, which are not entitled to specific support from the government.

Ireland

Government expenditure on science and technology in Ireland can be split broadly into support for: Technology Generation measures (e.g. R&D programmes), Environment and Infrastructure measures (e.g. education and measurement and certification services), and for Technology Diffusion and Adoption measures. In the area of Technology Diffusion and Adoption, Ireland has a proliferation of policy measures. Some of these overlap because funding opportunities have arisen and been exploited ad hoc, notably from European Structural Funds. Additional opportunities are exploited in European Union programmes for technology transfer.

It can thus be seen that quite a few programmes fit, at least conceptually, into a Demonstration and Awareness package, chiefly by providing technology centre services which are relevant to the full range of Irish companies. However, it must be stressed that there are no co-ordinated policies in Ireland covering technology demonstration or technology demonstration centres. Demonstration occurs, but usually within the context of other programmes, e.g. as part of the activities of R&D centres receiving funding from the Programmes of Advanced Technology (the PATs).

Italy

In Italy, two policy initiatives involving demonstration have been identified. On the one hand the technology transfer department of ENEA (Ministry of Industry) supports the exploitation of subsidised co-operative R&D-activities in the technological fields of ceramics/new materials, laser/electron beam, CAD/CAM and simulation software. If development projects lead to new products or technologies, the commercialisation of them is undertaken by commercial partners, who guarantee a technology demonstration service for interested enterprises. The visits and the demonstrations are financed by ENEA.

On the other hand the technological transfer department of the Ministry of Research is also involved in demonstration activities to some extent. It subsidises the use of technological equipment of institutions of the technology transfer system in order to carry out technical feasibility studies upon demand by enterprises.

Netherlands

In the Netherlands, there is a wide variety of organisations involved in demonstration activities: private firms, government departments (e.g. Ministry of Economic Affairs; Ministry of Agriculture, Nature Management and Fisheries), research and technology organisations, consultants and technology brokers. The extent to which the government is financially involved ranges from organisations being a government department to firms receiving a small contribution as a start-up premium. However, even though the Dutch technology and innovation policy has evolved into an integrated approach towards the process of techno-economic development, demonstration activities are not a core instrument in all transfer of know-how/technology. Consequently, the demonstration of new technologies was organised on a seemingly ad-hoc basis. Every now and then demonstrations occur in the technology policy instruments.

Portugal

In Portugal, the technology transfer infrastructure is split primarily into two groups: Technological Centres (demonstrating lower grade technology) and Institutes for New

Technologies (demonstrating higher grade technology) TDACs can be found within both of these types of structure. Demonstration activities in Portugal are recognised by the public authorities as being a valuable activity within TDACs. The Ministry for Industry and Energy (MIE) gives financial support through the PEDIP programme (which funds demonstration activities both directly and indirectly) and also actively monitors and evaluates the evolution of the centre and its activities as well as the degree of success. The rationale behind the creation of TDACs in Portugal is to create a progressively innovative 'enterprise environment'.

Spain

The Spanish policy makers neither on the national level (Ministry of Industry and Energy) nor on the regional level (regional councils) identify demonstration activities as part of their policies. They recognise the various activities of the Spanish technology transfer system, but they do not recognise demonstration activities as a distinct activity. Although policy makers do not support or finance demonstration activities directly there is some indirect support from the Ministry of Industry and Energy which contributes to the financing of the equipment of the national technology transfer structure. For example, the Spanish government has financed some development projects for the shoe sector which have included to some extent demonstration activities.

3 Development and Characteristics of TDACs in the European Union

This second chapter of the report aims to characterise TDACs in the European Union. The description is organised into six sections, each of them trying to answer some precise questions:

- **Definition**: What are the particularities which differentiate TDACs from other kinds of technology transfer structures?

- **Development of TDACs within Europe**: When have demonstration activities been launched? Are they still in development? What is the size of TDACs today? Are they part of a larger organisation?

- **Main technological fields and strategic positioning of TDACs**: Do TDACs focus their demonstration effort on new technologies? At which stage of the technological life cycle do they intervene? In which type of sector?

- **Client base**: Do the TDACs succeed in reaching small companies? What is their geographical scope?

- **Financing structure**: What is the balance between public and private funding? What is the involvement of regional authorities?

- **Main activities**: Which are the main activities associated with demonstration activities? Could different types of TDACs be identified on this base?

3.1 Definition

A 'Technology Demonstration and Application Centre' (TDAC) is understood to be an institution which mainly offers public or private enterprises demonstrations of new technologies and distributes these services in a systematic marketing approach. In addition to this, it can offer further services such as information about, advice or training on new technologies, testing and certification, and so on. In detail, the services offered include the following aspects:

- **Demonstration of New Technologies**
  The operability, competitiveness or specific application of new technologies are demonstrated to back up the information and consultation offered. Different media methods may be used for this purpose.

- **Information about New Technologies**
  First of all, general information about how the new technology functions and its productivity. In addition, general information about aspects of application such as general prerequisites of implementation, organisation or qualification for using the technology.

- **Advice about New Technologies**
  Individual consultation is also offered alongside general information. This may relate to company-specific technical aspects as well as questions of utilisation (e.g. introduction strategies, training, organisational adjustment, etc.).

The services offered are generally neutral with regard to technology suppliers, are presented without sales intention and are aimed at public or private enterprises (i.e. private households are not included as a target group). Based on this definition, a TDAC has to be distinguished from institutions with similar aims and services such as:

- **Technology Centres / Science Parks**
  These institutions provide young companies developing new technology products and processes with a fully developed infrastructure as well as services and advice. In contrast to a TDAC, this is only offered to companies based within a technology centre. However, technology centres and science parks may host TDACs (cf. Annex B).

- **Technology Transfer Centres**
  There are many different terms for this kind of institution such as technology transfer, technology advice, innovation advice or interface centre. Their common characteristic is that they all attempt to promote the transfer of information, knowledge and resources from Technological Resources Centres to companies. In contrast to a TDAC, the technology transfer centre does not necessarily have to be connected with the demonstration of systems or processes.

- **Exhibition / Demonstration Centres of Technology Suppliers**
  In contrast to a TDAC, these centres present manufacturer-related offers which aim to sell new technologies.

- **Consumer Advice Centres (e.g. local utilities, energy suppliers)**
  In contrast to TDACs, the services offered are aimed primarily at private households.

As 'Technology Demonstration and Application Centre' (TDAC) is not yet a common term or recognised category in the description of innovation support infrastructures or technology transfer structures, and as the study was to identify and to provide an overview of technology demonstration activities a wide definition with respect to the organisational settings in which TDACs occur was applied. Technology demonstration activities can be

- the sole or primary function of the organisation (i.e. the whole organisation can be considered a Technology Demonstration and Application Centre (TDAC)
- concentrated in a particular TDAC, e.g. a separate unit, within the organisation
- distributed around the organisation
- an infrequent occurrence in the organisation
- non-existent.

A slightly adapted differentiation of very strong to non-existent technology demonstration in an organisation has been included in the questionnaire.

Of the 204 organisations which properly filled in the questionnaire, three classes with respect of the importance of demonstration activities can be distinguished:

- **Non TDAC** (5% or 10 respondents of the sample) - where the demonstration activity is **not important**. These centres have been kept out of the analysis.
- **Weak definition TDAC** (18% or 36 respondents of the sample) - where the demonstration activity is **not an important** activity of the centre.
- **TDAC** (77% or 157 respondents of the sample) - where the demonstration activity is strategic for the centre, i.e. it was called **important or very important** in the questionnaire.

The last group can be differentiated further with respect to the promotion of demonstration activities: every seventh TDAC of this group does not promote its activities on a systematic basis (by mailing, participation at conferences or fairs, publications in relevant journals, advertisements in relevant media). They are termed **intermediate definition TDACs**. Consequently, **strong definition TDACs** make up for approx. 70% of TDACs in the survey.

Weak, intermediate and strong definition TDACs have been taken into account in the following analysis, representing 194 TDACs.

3.2 Evolution and Current State of TDACs in the European Union

The focus on demonstration activities and the establishment and support of TDACs varies within the European Community. Analysing the historical development of TDACs, one can note that, for example, in Denmark demonstration activities were a topic of concern to policy makers in the early to mid eighties. Today, however, demonstrations are no longer part of the Danish technology transfer policies. In the mid eighties, a number of programmes on technology transfer which included the founding of TDACs were also started in Germany. Today German policies continue to support TDACs, although the focus has switched to the new German states ('Neue Bundesländer') where just recently new TDACs have been installed (see the German Country Report). The UK seem to have a longer history of TDACs as more than half (15 of 24) of the British TDACs answering the questionnaire were founded before 1985. However, this is due to the fact that technology demonstration in the UK merely is a distributed or infrequently occurring activity. Thus, the dates usually refer to the host organisation. In the Netherlands the first real TDAC started its operation in 1987. The establishment of TDACs in some Southern European countries was rather late; in Spain and Greece, TDACs as defined by the project are quite young (late 1980s but mainly early 1990s).

Launch of the demonstration activity

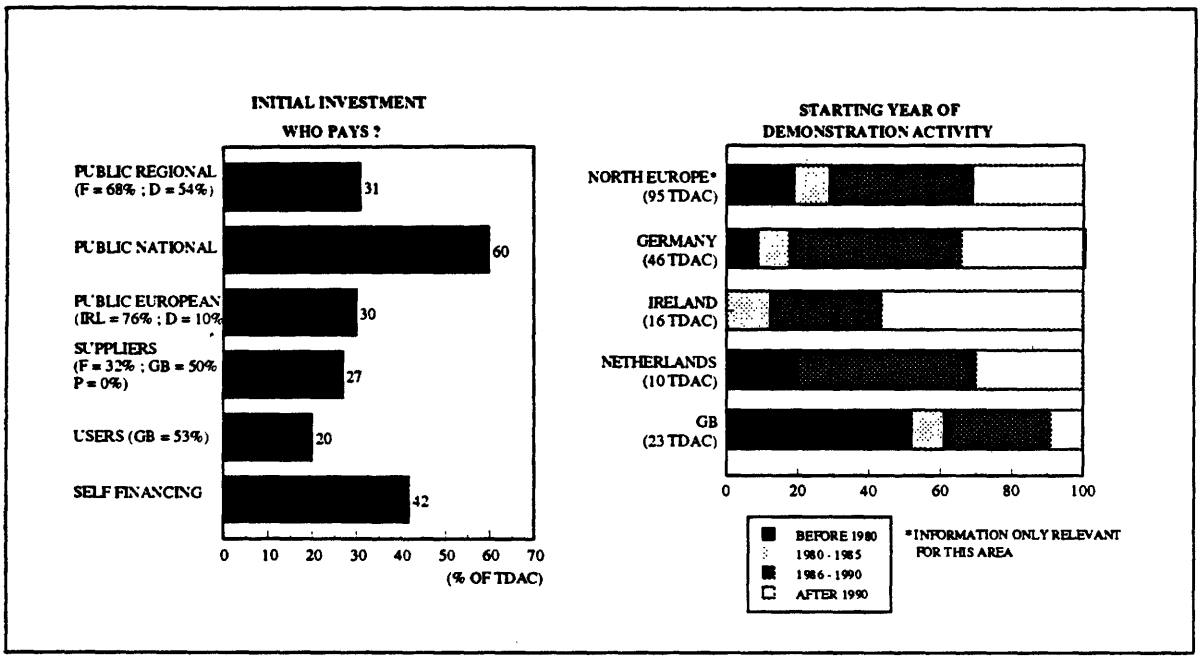
- **Demonstration activities are still in development in the European Union**
  75% of the European demonstration activities have been launched during the last 10 years. In Spain and Italy, these activities are much more recent (launched after 1990) and Germany's situation is also quite specific as demonstration activities experienced a "push" effect from various programmes in the 1980s. This development appears to be continuing: more than 40% of TDACs have increased their staff related to demonstration activities over the last 3 years (only 13% have decreased their staff). In the future, the development of the demonstration activity is still considered a priority for a great proportion of TDACs over the next three years: 48% plan to increase the proportion of activities devoted to demonstration (4% will decrease them) and 53% plan to develop the range of demonstration facilities utilised (5% will decrease the range).

The initial investment by public authorities (regional, national or European) depends a great deal upon the country (see Figure 3-1). But it is worth mentioning that:

- national public authorities are much more involved in the initial investment than regional bodies (with the exception of France and Germany)

- initial investment is usually not 100% publicly funded - private suppliers and potential users are involved in the investment in more than 25% of the cases.

Figure 3-1: The Launching and Funding of TDACs



Having discussed the context of the initial investment with the TDACs managers, two additional interesting points appear:

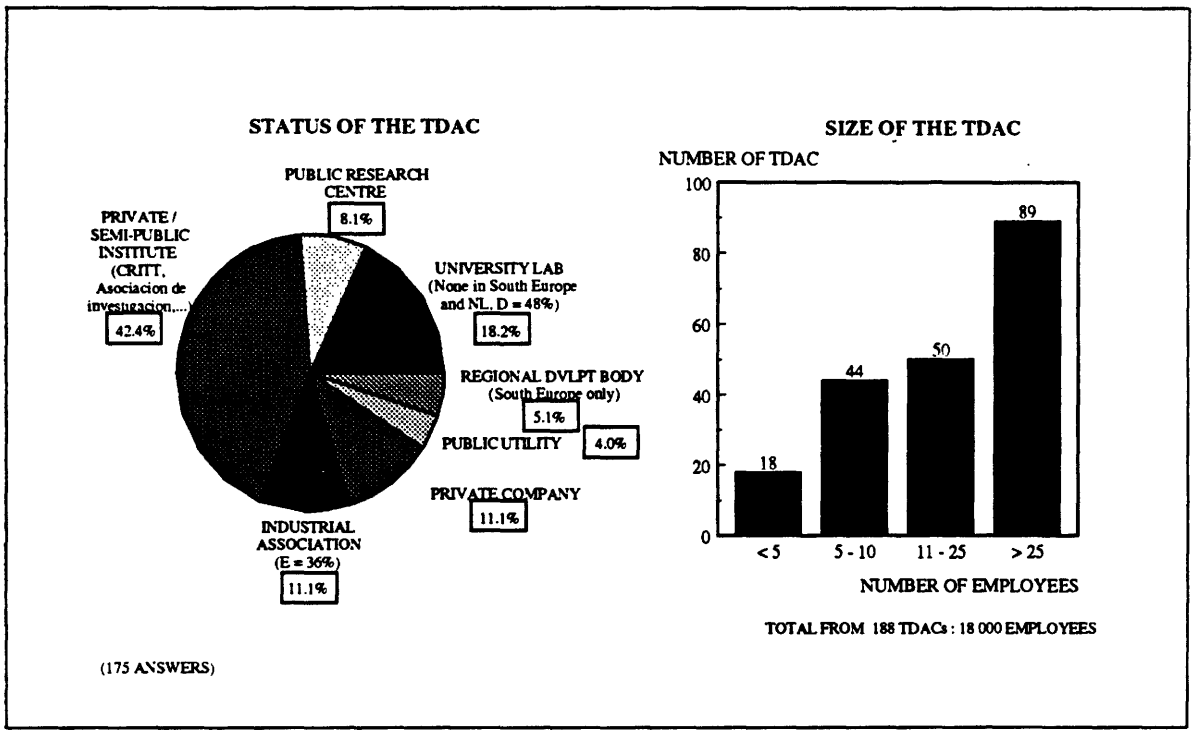
- First of all, the initial investment was not always dedicated to demonstration,
- Secondly, the TDACs did not usually launch a market survey before the initial investment. The launch is very often the result of an individual initiative, irrespective of the needs of SMEs or the existence of available equipment in other organisations like training institutes or large companies.

Status and size

The TDACs surveyed in the European Union in mid 1994 account for around 18 000 employees. In terms of organisation, these bodies are very diverse but three points should be underlined (see Figure 3-2):

- 60% of TDACs employ less than 25 people (33% less than 10 people);
- **Almost 60% of TDACs are part of a larger organisation.** The rest are independent units. Most of the independent TDACs can be found in Italy, whereas TDACs, as part of a larger organisation, are characteristic for Germany and Ireland;
- **Only a quarter of TDACs** are located within public research labs (approx. 50% in Germany, 15% in France).

Figure 3-2: Status and Size of the Unit in which Technology Demonstration Activities Occur



3.3 Technological Fields and Strategic Positioning

Technologies in demonstration

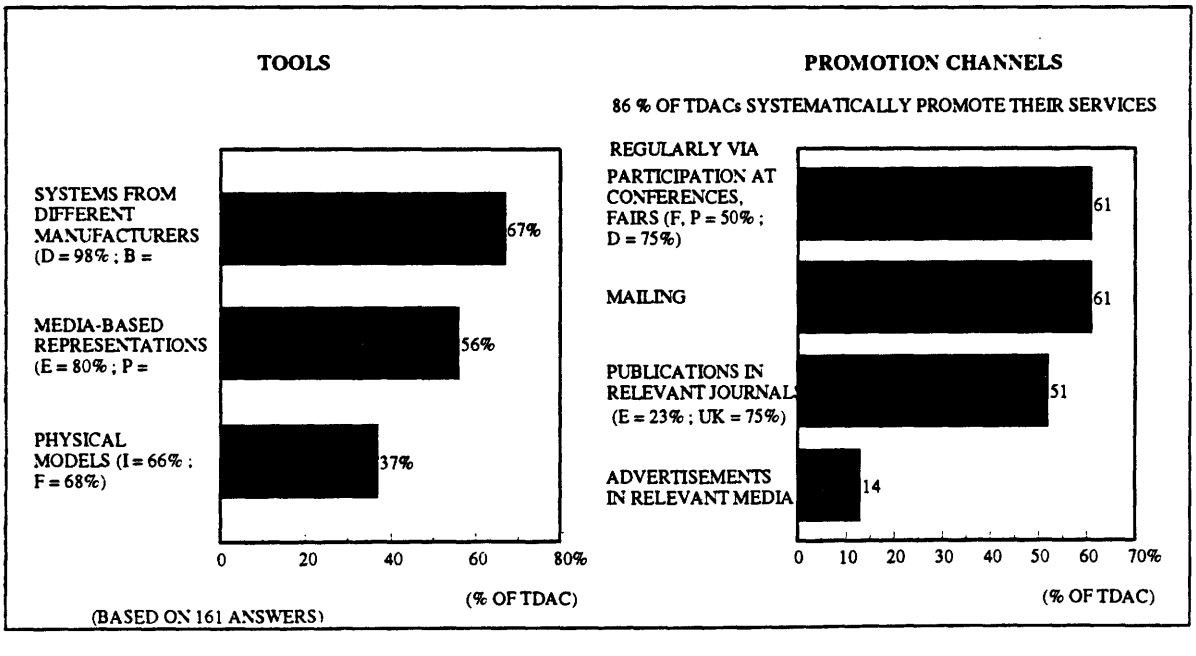
Technologies demonstrated predominantly fall into four classes:

- **Manufacturing technologies**: CAD-CAM, laser, wood techniques,...
- **Electronics, communication and information technologies**: software applications, optical telecoms, multimedia,...
- **Materials**: composite, ceramics,...
- **Environmental technologies**: membrane filtration, waste treatment,...
  Demonstration activities in this field have developed faster than the others during the past 3 years.

These four classes represent almost 80% of the technologies being demonstrated.

As detailed in Figure 3-3, these technologies are demonstrated via three main channels: systems from different manufacturers, media-based representations which are used in more than 50% of the TDACs and physical models.

Figure 3-3: Tools Used to Demonstrate Advanced Technologies and Promotion Channels



In addition to the technological field covered by the technology, it is interesting to look at how novel the technology is for the industry targeted and where it is at in terms of diffusion.

Some TDACs demonstrate new technologies in an industry: they target avant-garde firms and require R&D competencies to adapt a technology to the particularities of the sector. Others, however, are oriented towards technologies already diffused in the industry: they target followers and R&D is much less strategic for them. This typology, deduced from interviews with the TDAC managers is confirmed by the analysis of the associated activities of TDACs (see Chapter 3.6).

From the policy maker's point of view, two types of demonstration tool appear quite clearly which can be used, depending upon the objectives of their industrial policy: focus the main effort either towards the leaders (hoping that they will have a springboard effect on the others) or towards the followers (to achieve a balanced economical development).

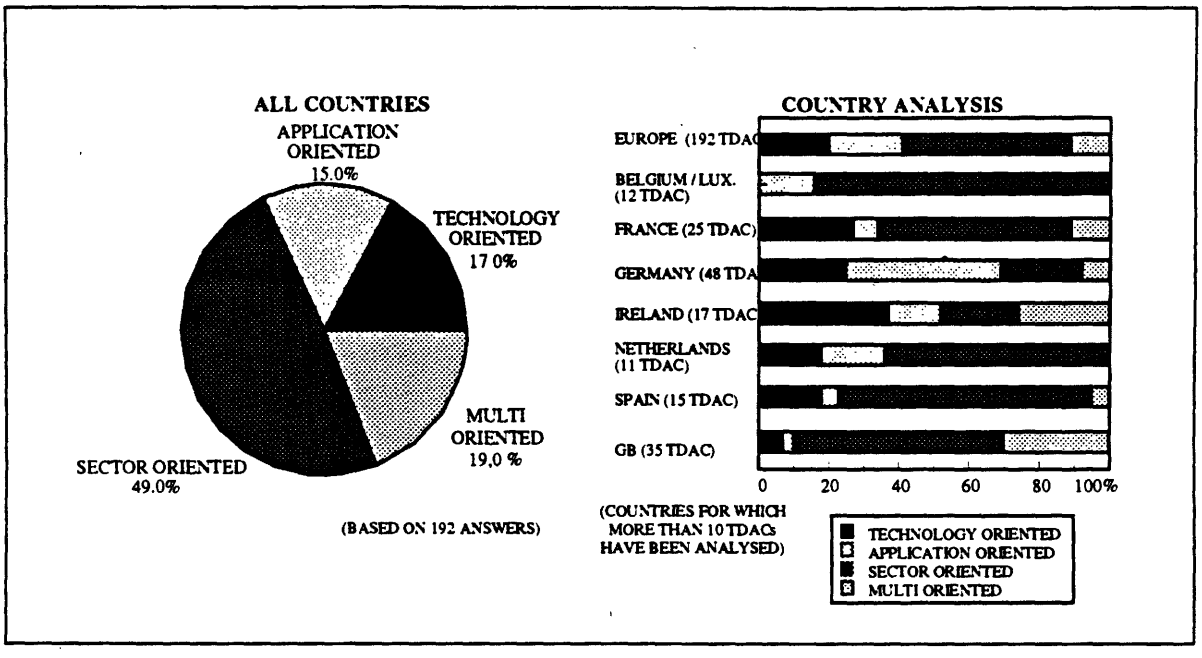
Strategic positioning

Around 50% of TDACs are sector oriented which means that they focus their demonstration efforts on a single sector (see illustration of a sector oriented in Annex C). This proportion is much higher in Belgium, Spain and Netherlands. The targeted sectors are generally traditional (wood industry, footwear, meat industry, foundry,...) and managers of such TDACs explain that one of the main bottlenecks for them is to attract, recruit and keep qualified staff.

One third of TDACs are application / technology oriented. For these centres the importance of demonstration is higher than for sector oriented TDACs. This proportion is much higher in Germany and little higher in Ireland. According to the managers, one of the main issues for technology/application centres is to follow-up the technological evolution at the international level. Most of them express their interest for participating in international networks.

Figure 3-4 illustrates the strategic positioning of TDACs within the European Union.

Figure 3-4: Strategic Positioning of TDACs



3.4 Client base

TDACs are well suited for working with small companies

As demonstrated by Figure 3-5, almost ¾ of TDACs work mostly for small enterprises (less than 50 employees). In addition to that, it should be mentioned that more than half of these customers are very small enterprises (less than 10 employees) which means that TDACs succeed, at least partly, in enlarging the club of "traditional" customers of Technology Transfer structures.

The Figure 3-5 shows also the large geographical scope of TDACs. Almost half of the centres are virtually entirely oriented towards non regional SMEs. This aspect is confirmed and developed by the analysis of the proportion of international customers (Figure 3-6). In fact, 2/3 of the European TDACs have at least one customer from abroad and the international market represents more than 10% of the total number of customers for almost a quarter of the TDACs. This figure is very different in some countries such as France where TDACs are not internationally oriented at all.

Figure 3-5: The TDAC Client Base (1) - Size of Customers

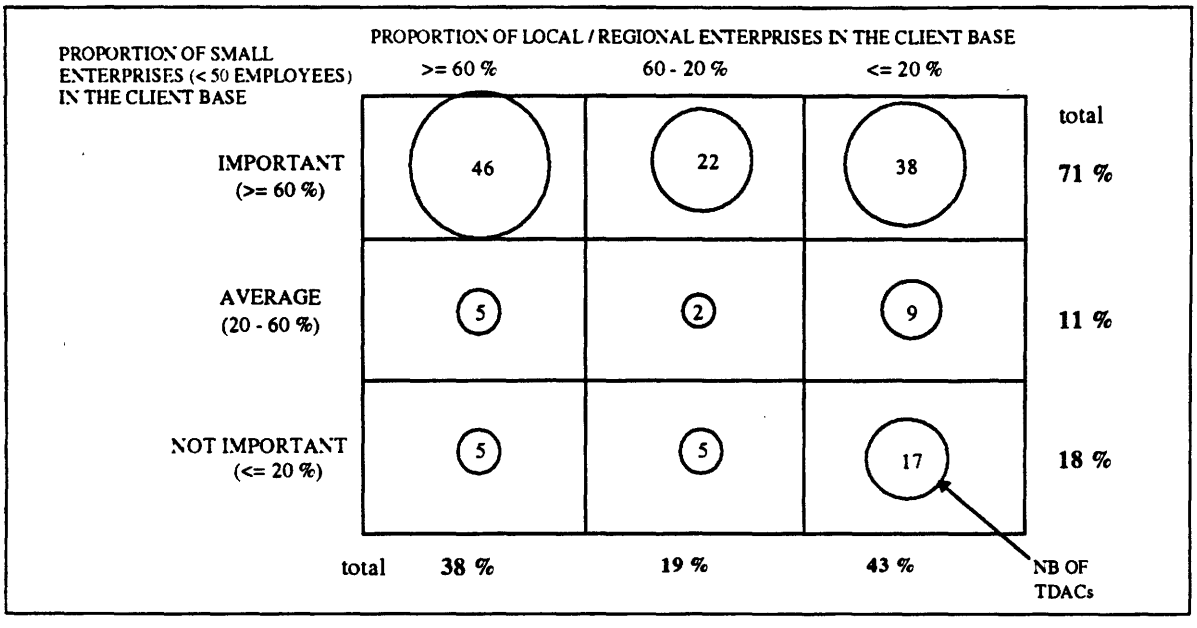
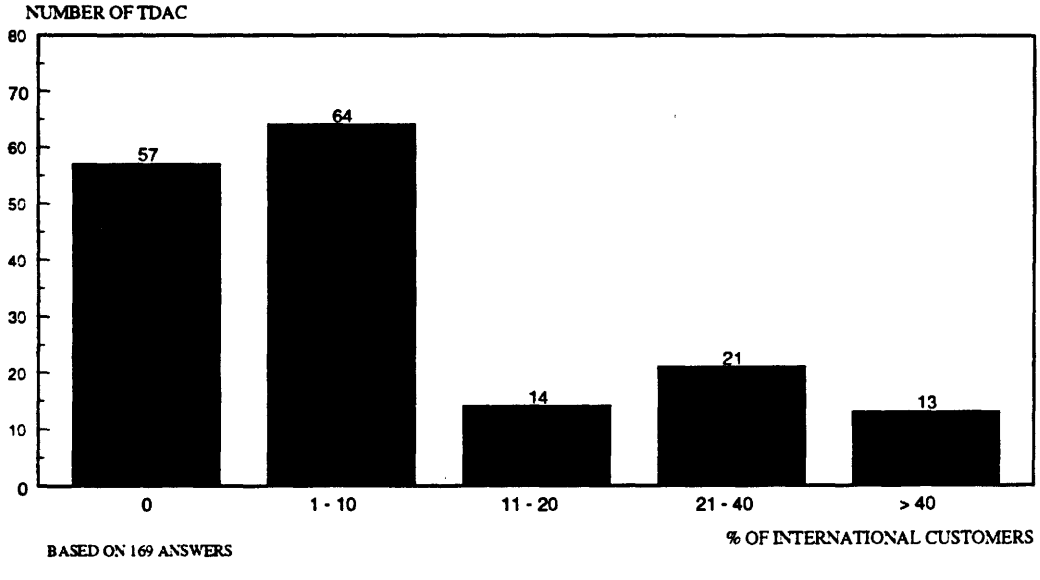


Figure 3-6: The TDAC Client Base (2) - International Customers

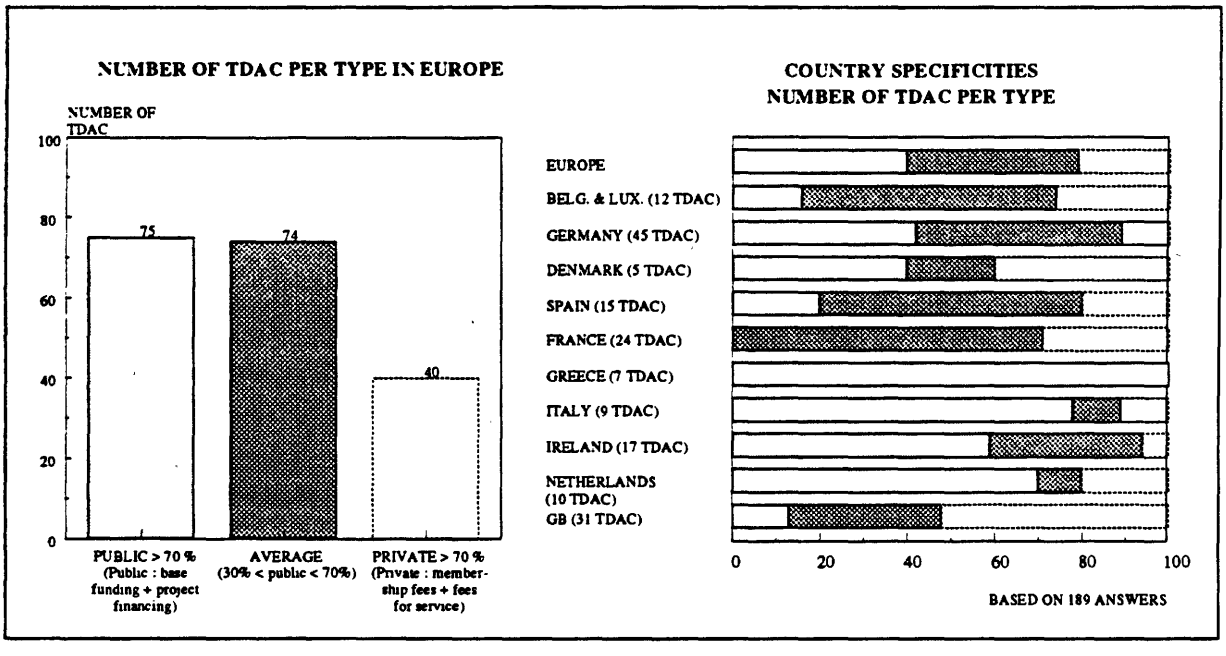


3.5 Financing Structure

The main financing sources of TDACs vary considerably from one country to another so that to speak of a European average would be meaningless.

As shown in Figure 3-7, public sources are very dominant in Greece, Italy, Ireland and the Netherlands, they are less important in France and Great-Britain.

Figure 3-7: Three Types of Financing Structure and their Distribution by Country



Globally in Europe, 40% of TDACs strongly depend on public subsidies, i.e. they are financed more than 70% by public funding. This percentage is correlated with the importance of demonstration activities: 20% of the weak definition TDACs benefit from this percentage of public funding compared to 50% of strong definition TDACs (where demonstration is one of the most important areas of activity).

3.6 Main Activities: Towards a TDAC Typology

Demonstration of advanced technologies is very rarely the only activity of TDACs and in fact, is considered as a very important activity by only 42% of the TDAC managers (Figure 3-8 and 3-9 for country particularities), another 36% consider it important.

The TDACs' portfolio of activities serve different, non-exclusive missions:

- Conception of a new process or adaptation of a new technology to the particularities of one sector (R&D),
- Awareness / illustration of advanced technologies (information, demonstration),
- Feasibility / adaptation of advanced technologies (demonstration, testing),
- Integration of advanced technologies (technical assistance, training),

Figure 3-8: Main Activities of TDAC

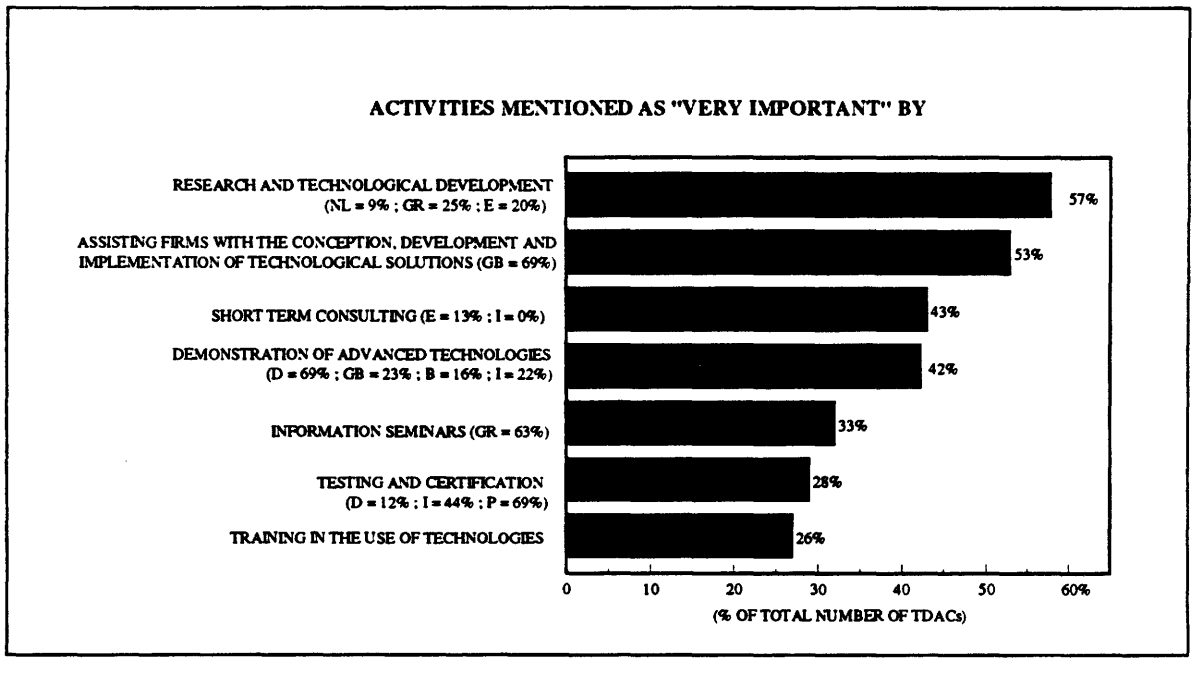
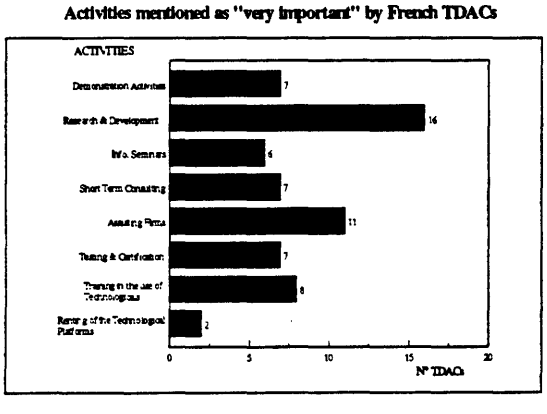
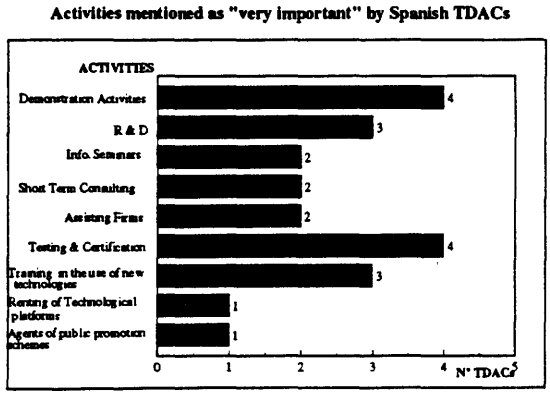


Figure 3-9: Main Activities of TDACs - Country Particularities

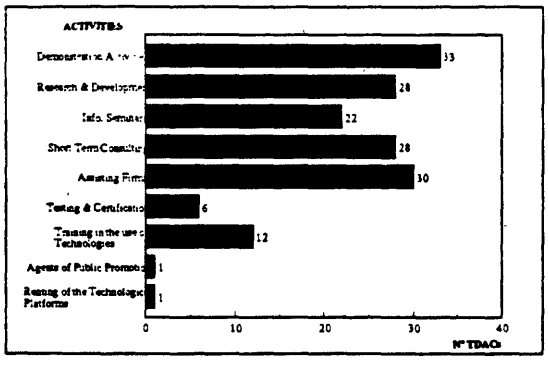


Based on 25 responses



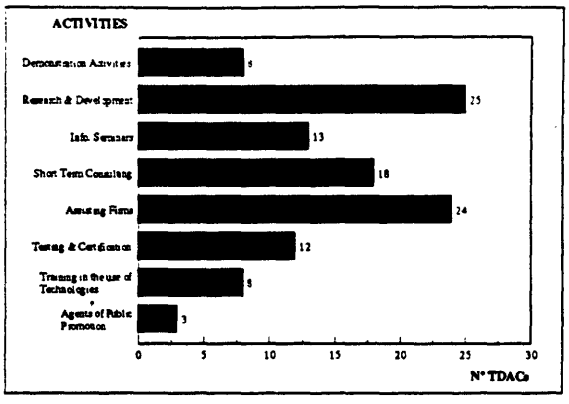
Based on 15 responses

Activities mentioned as "very important" by German TDACs



Based on 48 responses

Activities mentioned as "very important" by UK TDACs

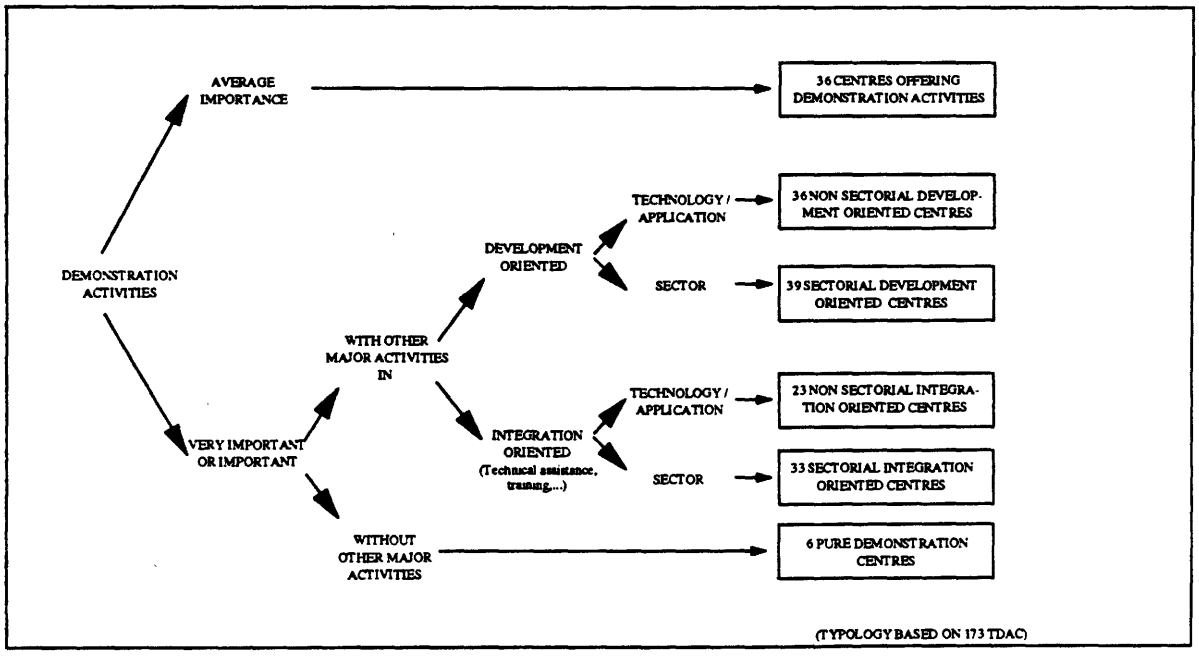


Based on 35 responses

As a synthesis to this chapter, the global typology of TDACs should be kept in mind, including the different perspectives:

1. the weighting of the demonstration activities in the global activities of the centre,
2. the type of activities associated to demonstration,
3. the strategic positioning of the centres (sector, technology, application oriented).

Figure 3-10: Proposed Typology



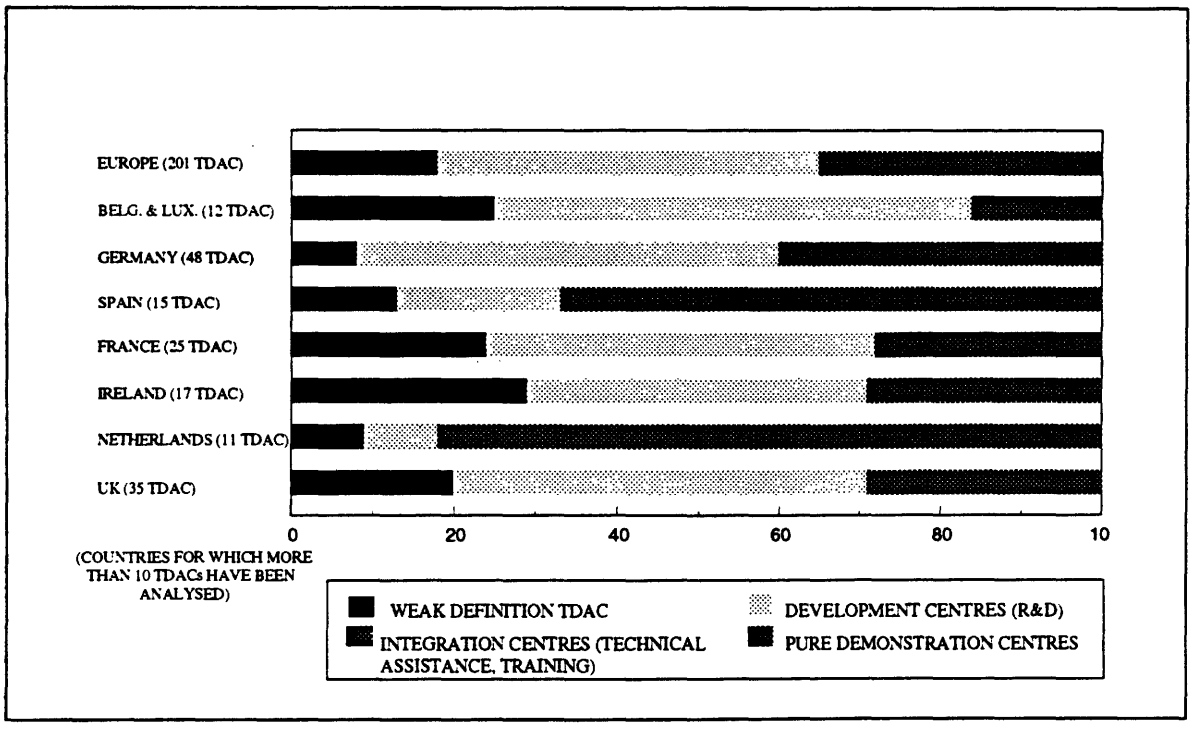
Excluding "**weak definition TDACs**" (for whom demonstration is not a major activity) and "**pure demonstration centres**" (which only provide demonstration *stricto sensus*), see the example of the Demo-Center in Annex C, two types of TDAC appear:

- **Development centres** (47%) - oriented towards non mature technologies, which develop / adapt and demonstrate technologies, generally for a first time in avant-garde firms. (See the example of the CRIF Metal in Annex C)

- **Integration centres** (32%) - generally oriented towards the demonstration of mature technologies and helping SMEs to integrate / use efficiently the innovation: assistance in the choice of suppliers, elaboration of training programmes, assistance during the launch of the new product / new process,... As mentioned by French SMEs, the value added of such a TDAC consists mainly "in the breaking-down of the reticence of both management and employees". (see the example of the Pôle de Plasturgies de l'Est in Annex C).

As detailed in Figure 3-11, integration centres and development centres are fairly well represented in each country, even if some particularities can be noted: a predominance of integration centres in the Netherlands and Spain, and development centres in Belgium.

Figure 3-11: TDAC Typology Based on Associated Activities - Country Specificities



4 Main Issues in TDAC Management and Policy

A comprehensive analysis of the TDAC survey and interview results led to the identification of a number of major aspects concerning TDAC strategies, their role within the technology innovation and transfer activities, and the assessment of their activities. This chapter elaborates on the following major issues which also form the basis for the policy issues discussed in the next chapter:

- demonstration is complementary to a number of main activities of a TDAC;
- promotion of demonstration activities is important for TDACs;
- TDAC strategies differ depending on the orientation of the centre (i.e. application, technology or sector);
- a TDAC has to adjust to the diffusion process of a technology;
- the assessment of a TDAC is a complex and difficult process which is currently only insufficiently pursued but needs further development;
- although TDACs are active within their region, it is difficult to identify their regional significance;
- TDAC missions and strategies are seldom based on the assessment of client demand, but follow a supply orientation, e.g. in the context of technology push programmes;
- the timing and the integration of technology demonstration within overall technology transfer and innovation programmes are important for the success of a TDAC.

4.1 Range and Integration of Services in TDACs

The demonstration of technologies and their application possibilities alone do not provide a sufficient basis for a TDAC. Thus demonstration is very seldom the only activity of TDACs. Although 40% of the responding TDACs reported demonstration as an activity of major importance, the interviews showed that demonstration activities are in general complementary actions to support the main objectives of the organisation. A range of **integrated services** is being offered by most of the TDACs identified. Services such as the assistance of firms not only in selecting a suitable technology but also during the planning and implementation phases are indicative of the integration oriented characteristic of the support offered. Activities of TDACs can be grouped into three categories:

a) key basic activities and tasks to diffuse new technologies,
b) services which are offered to attract clientele in order make them aware of new technologies and to promote other services or products of a TDAC, and
c) supporting services which are part of the paying/financed tasks used among others to supplement the TDAC budget.

Category (a) contains activities which are basic to the organisation's mission including those that are commonly associated with technology transfer. The major activities which were reported by more than 50% of the TDACs as important or very important are:

- research and technological development
- assisting firms with the conception, development, and implementation of technological solutions
- short term consulting
- training in the use of the technology.

Demonstration activities as well as information seminars and workshops for technology transfer belong in most cases to **category (b)**. Demonstration of advanced technologies can be considered as being complementary to other technology transfer measures or to major objectives and activities of a centre. In most cases demonstration is a means to promote and disseminate other services. The opportunity to view a new technology and observe its performance in a controlled environment will not directly lead to its implementation. Follow-up assistance is necessary, i.e. activities listed under category (a) above will be required by firms. Demonstration will only be effective if it is combined with some other form of communication or service for the potential user. This could include counselling, seminars, training, etc.

In some cases demonstration activities are used to promote R&D and to market products developed by the centre itself. This was exemplified by the Danish TDACs (see the Danish Country Report) which demonstrated their developments in the fields of simulation technology to their prospective clients.

Demonstrations can also be part of comprehensive workshops or seminars arranged by a TDAC. These seminars are aimed to give: (1) suppliers a chance to demonstrate and promote their equipment and (2) potential users the opportunity to compare at one location technologies from different manufacturers. The centre uses the seminars as a trigger for their main activities aimed to support an interested client in the adaptation phase of the new technology.

A look beyond Europe to the USA and Japan reveals that in these countries, demonstration activities are also part of a number of other activities or services (for more details see the country reports). In the USA, for example, demonstration can be a step in the development cycle of a new technology. Prototypes of the system are demonstrated to potential customers (users) and then refined to better meet the user requirements. Demonstrations are also used to enhance workforce training in new technologies.

Testing and certification, renting of the technological platforms to clients, and acting as agents for public promotion schemes are examples of tasks which belong to **category (c)**. These are services which are usually attached to a centre due to the existing know-how and available technology. The activities are often not considered to be important for the main mission and task of a centre. In many cases, however, they provide a financial basis for maintaining TDACs. To the majority of the TDACs responding in the survey however these services were of low importance.

A typical TDAC will offer services of all three categories although with different importance or emphasis. Clients appreciate the broad portfolio of services being offered by TDACs. Firms look for TDACs in order to obtain neutral and competent advice on advanced technologies that goes beyond the initial demonstration process. The possibility to obtain assistance during the planning and implementation phases of moving to a new technology as an integrated service with demonstration is rated very favourable by clients and gives TDACs a competitive edge over other forms of demonstration of new technologies.

If we define typical portfolios of TDAC activities as those which consist of activities shared by more than 50% of all the responding TDACs of a country the following basic pattern will be obtained for most countries:

- demonstration of advanced technologies
- research and technological development
- assisting firms with the conception, development, and implementation of technological solutions
- short term consulting.

This basic portfolio is augmented in for example Germany by 'information seminars and workshops for technology transfer' or in Portugal by 'testing and certification'. Considering increasing budget and personnel as indicators for successful TDACs it was found that the majority of those identified offered services listed as typical portfolios.

4.2 The Promotion of TDAC Services

One of the important issues for TDACs is the attraction of a sufficient number of clients. To meet their goals most of the surveyed TDACs promote their activities in a systematic way (see Chapter 3). Active promotion appears to be necessary as small enterprises are especially difficult to reach and attract. There is some reluctance in firms to approach

organisations or institutions which are associated with high level research institutes. Promotion has to convince potential clients that TDACs will assist them with their day-to-day technical problems and that they as actual users will benefit from the new technology. There was some concern by clients about a lack of transparency/visibility of the TDAC activities. It should become clear to clients how they can benefit from the new technology.

The most popular ways to promote the TDAC services reported are:
- participation in conferences, seminars, fairs, etc.
- direct mailing of specific information on programmes, activities, technology, etc.
- publication in relevant professional journals.

Advertisements in relevant media are less favoured by most of the TDACs. Some of the TDACs interviewed make use of address lists of contacts they have collected over the years of their activities. They keep track of all of their clients and keep them informed about any new developments.

Promotional activities vary somewhat between countries. In Denmark TDACs do not systematically promote their services. In countries like Germany or France on the other hand 39 of 44 and 21 of 28 TDACs respectively reported systematic promotion activities. The focus is also different from country to country. In Germany and Great Britain for example TDACs depend more on publications and participation in conferences etc. whereas French TDACs favour mailing of special information and publications. Italian TDACs prefer a mix of mailing and participation in conferences.

Increasing their marketing efforts ranks fourth in the planned TDAC activities for the next three years. Promotion is especially important for TDACs which have to finance their activities to a large part from fees of services or new TDACs which are less known in a region. Promotion can span across regional and even national boundaries as is the case with some of the internationally active centres (e.g. from Denmark).

The survey on the European TDACs has shown that more than three quarters of the clientele of the institutions consist of small and medium sized enterprises, nearly half of them being small enterprises with less than then employees. Furthermore, only about 40 % of their customers come from the region, where the respective TDAC is located. An increase in the percentage of customers coming from other European countries, at present about 12 %, can also be noticed. This mix of customers is obviously demanding with respect to marketing strategies.

4.3 Appropriateness of Technology, Application, and Sector Oriented Strategies

The study (cf. Chapter 3) has shown that the distinction made between technology and application oriented TDACs on the one hand and sector oriented TDACs on the other hand formed an appropriate criterion for a categorisation of the institutions:

- Technology oriented centres can be characterised as those institutions where only one technology (e.g. laser technology) is demonstrated for a great number of application fields and sectors.
- Application oriented centres demonstrate several technologies for one application field (e.g. laser cutting, water jet cutting).
- Sector oriented centres are those institutions where different technologies for several application fields in one sector (e.g. textile industry) are demonstrated.

Related to their general orientation, TDACs show specific dominant characteristics which could impinge on their performance:

- Technology oriented TDACs show a high degree of R&D activities, they promote their activities to a larger extent by conferences and, compared to the other types of TDACs, the level of obstacles to their work is very low. These institutions see their strong point in the evaluation of future needs, especially of customers and of technological developments. In the future, they wish to increase their turnover, the number of their clients and the range of sectors, for which demonstrations are carried out. This organisational type is often part of a larger organisation, e.g. a university or another research institution and concentrates on the technology fields: electronics, information and communication technology and manufacturing technology.

- Application oriented TDACs show a high degree of demonstration and information activities and their activities are predominantly promoted by direct mailing. They see the financing of their institutions as an obstacle in their work, however, a strong point concerns the recruitment of staff. It is planned to increase the range of demonstrations and to intensify their participation in national and European programmes. This organisational type is often part of a larger organisation, concentrating its activities on electronics, information, communication and manufacturing technology. They are similar to the technology-oriented type.

- Sector oriented TDACs focus their activities on short-term consultations and training. They publish their activities in magazines and see the recruiting of staff, the development of strategies, and the attraction of new customers as their weak points. On the other hand, the development of services which complement their demonstration activities are seen as a strong point and in fact, over the next years, they want to intensify their demonstration activities. Sector oriented TDACs are often independent institutions, many of which were founded many. years ago. Their demonstration activities cover a wide range of technological fields.

The three organisational types can ideally be related to the technology life cycle. In the early phase of technology diffusion, where information and the demonstration of a new technology are still at the beginning, technology oriented TDACs are the appropriate institution for the demonstration. During the increasing diffusion of a technology other questions, such as the introduction, organisation, and economic viability become more significant (apart from technical aspects). During these phases, application oriented TDACs, which offer also further services beyond the mere demonstration of a technology, seem to be the appropriate organisation. However, in the late phase of technology diffusion, when questions of the broad diffusion and of the promotion of structural changes come to the forefront, sector oriented TDACs seem to be the adequate organisation type. Such institutions play an important role in the technology transfer of whole branches or regions.

4.4 The Management of Change

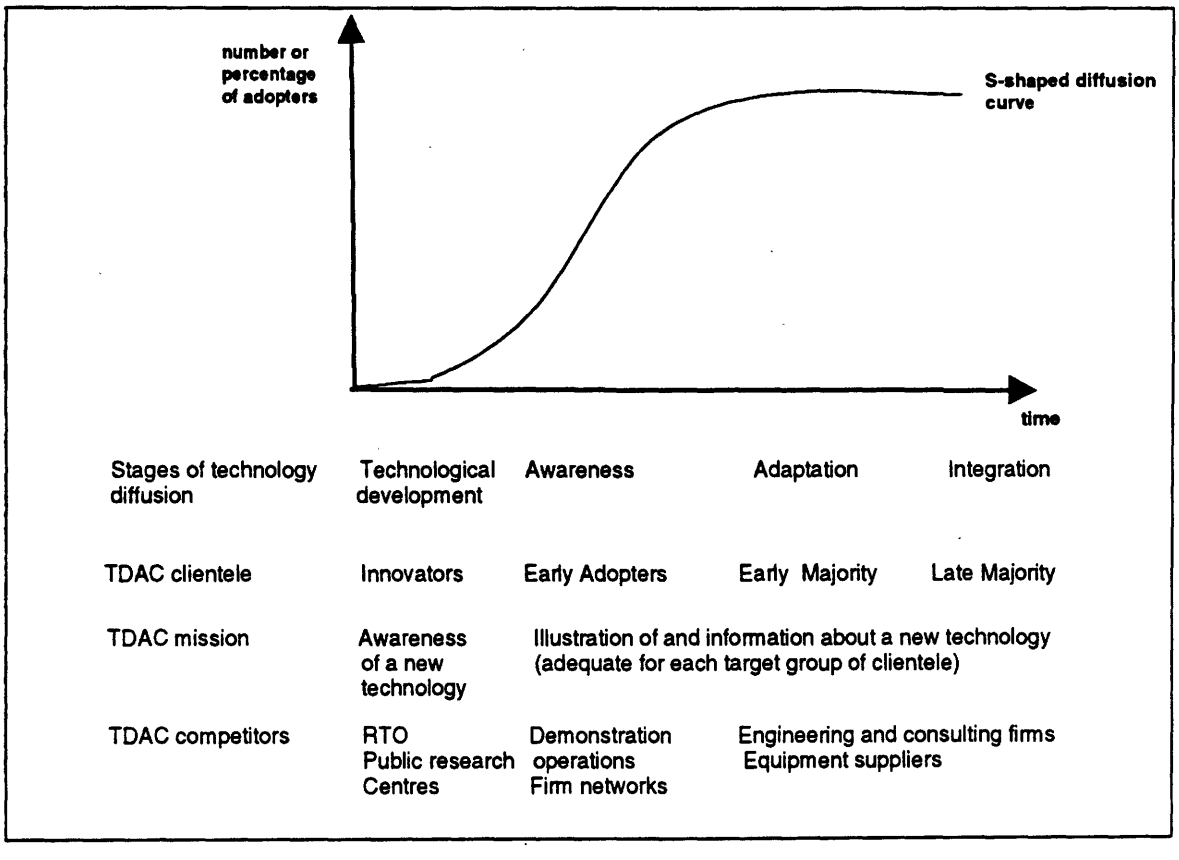
The development of TDACs, above all the technology-centred ones, is closely linked to the pattern of diffusion of the particular technology in the economy. Status and speed of the technology diffusion have impacts on the number and type of potential customers, the function of TDACs in the national innovation system, the form of services offered, and the competitors of TDACs (cf. Figure 4-1).

In the early phases of technology diffusion, in which technology or its application has not reached full maturity in all aspects, usually only a few innovators are interested in the new technology because of the many uncertainties involved. TDACs have the primary task at this stage to make the existence of the new technology known to the largest possible target group and to point out fields for its efficient and profitable application. The clear demonstration of the technology and the distribution of information on potential performance as well as possible fields of application form the main focus of a TDAC's task at this point. As a rule, there are hardly any comparable offers of demonstration or

information at this juncture, so that only public research institutions will be potential competitors.

With the increasing spread of a technology, the number of parties interested in the demonstrations and consultancies offered by a TDAC tend to increase. The step-by-step differentiation not only of the technology but also of the demonstration and consultancy offered (e.g. fairs, manufacturers' exhibitions) is usually accompanied by a change in the type of need for information about the new technology. Where at first potential technology users are primarily interested in the questions of performance and application possibilities of the technology, peripheral aspects of the technology application tend to become more and more important, e.g. profitability, the organisational integration of the introductory strategies, etc.

Figure 4-1: The Challenge of Change



As a result of the strong links with the extent and speed of technology diffusion, TDACs must be in the position to adjust or transform themselves regarding the services they offer,

target group(s), their mode of addressing customers, necessary qualifications, etc. If this process is accompanied by a steady cut-back in public support, then the TDACs are also faced with the challenge of guaranteeing the continuation of the institution by securing adequate liquidity.

The phase concept presented in Figure 4-1 represents merely a simple model of reality; as a tendency, however, the individual phases can be observed in a variety of demonstration facilities. The chronological sequence of the individual phases depends above all on the speed of diffusion of the particular technology. It is clear, however, that in technology-centred demonstration facilities many parameters are subject to considerable changes within relatively short increments of time. TDACs fulfil their tasks above all if they are capable of continuously adjusting to the changes caused by the technology diffusion. In the future, therefore, the management of change should be more active and systematic than it has been in the past. Herein lies the great opportunity to design the TDAC services to meet the phase-specific customer needs, and thus in the final analysis to improve the efficiency of the national innovation infrastructure. To better support TDAC management in this task additional research will be necessary to better understand the relationship between technology diffusion and TDAC strategies. The principal two options of adjusting the portfolio of services to the growing maturity of the technology (i.e. integration orientation) and of switching to new technology fields (i.e. development orientation) inhibit a number of challenges.

4.5 The Assessment of TDAC Performance

Particularly among policy makers there is some dissatisfaction about the approaches and instruments available to assess the success and performance of TDACs (and more over technology transfer bodies in general). The performance of a TDAC and the assessment of its success is however largely dependent on the mission or goals of the centre. The objectives of a TDAC will vary depending on the role it plays in the diffusion of technology.

TDACs differ not only in their size, organisational structure, and technological fields covered, but also in the mission that they have been set out to fulfil. Among these are:

- technological development and research
- awareness/illustration (i.e. elimination of information deficits) of advanced technologies
- feasibility/adaptation of new technologies (from the basic research phase to the practical use) for SMEs

- integration of new technologies within SMEs i.e. to provide practical and economic solutions.

Depending on the adopted missions and the orientation of a TDAC (e.g. technology, application, or sector centred) different strategies (financing structure, type of technology demonstrated, target groups, etc.) will be significant. Also the evaluation criteria will differ depending on the mission. This is particularly so as the level of diffusion of a technology cannot be the same for each type of TDAC. Some TDACs will be initiated ahead of the marketing of a technology i.e. at the end of the research and development stage (at the beginning of the diffusion cycle). Others will pick up a technology that has already achieved some market penetration. Accordingly the type of clientele to be addressed will vary between avant-garde firms and followers respectively.

In Germany for example many TDACs see themselves as important actors in the early stages of technology diffusion. Their success will be difficult to measure as the commercial value of their activities cannot directly be determined. Enterprises will either not readily reveal their source of innovation or are not able to trace back its origin.

The assessment of TDAC performance should consider the interests of the various actors concerned with or effected by the TDAC activities. Political decision-makers, TDAC managers, or TDAC customers will all have different perspectives for evaluating a TDAC depending on their motives and expectations.

The measurement of a TDAC' performance is thus complex and difficult to perform. It is generally not practised by TDACs at this time. This does not mean that TDAC managers and policy makers do not evaluate at all the success of a TDAC's operation, but that the criteria used, however, are only indicative of directly measurable factors such as:

- the client base (size) which is estimated in part on the following factors;
- the number of demonstrations performed (including the number of firms/persons attending)
- the number of seminars or workshops held (including the number of firms/persons attending);
- the number of persons trained;
- the number of clients that have been contacted by or that have called on a TDAC (consulting activity);
- length and type of relationship with clients;
- the projects completed;
- development of turnover and size of staff;

- the ability to acquire non-public funding, or the survival after public funding has ceased, i.e. measurable economic success.

Factors which are more tangible and difficult to measure and especially which are related to clients' needs and requirements, have up to now only rarely been used to assess TDACs. These include such aspects as:

- the technical competence (especially the knowledge of strengths and weaknesses of different products available on the market);
- the objectivity of the advice given and the quality of the demonstration set-up (it is important that demonstration activities focus on real applications of technologies rather than on 'science fiction');
- the effectiveness of a TDAC in regional development (i.e. establishment of new firms, restructuring an industry, diversification, etc.);
- the contribution of a TDAC to the innovation capacity of a region;
- the degree to which a TDAC's activities meet the demand of the potential client base;
- the impact on customers.

In light of the above discussion and the results of the study there appears to be a considerable need to:

a) develop the necessary tools and methodologies to assess TDACs in their performance, and

b) to perform a co-ordinated evaluation study in a selected number of European countries.

The results of such a neutral study, especially in countries with successful TDACs, would provide an excellent basis for further EC initiatives in this particular area of technology transfer.

The case studies of the present study were used to obtain some indication on how effective TDACs have been in their activities. The results can be summarised as follows (for more detail see the country reports):

- TDACs are appreciated by clients for their expertise, neutrality, and the integrated support they provide and the assistance which goes beyond the mere technical aspects of advisement, e.g. organisational changes, is well conceived;
- TDACs have been successful with their demonstration activities in reaching SMEs in several of the countries analysed (e.g. France, Germany, Italy). This is the general opinion expressed by policy makers and clientele interviewed;
- TDACs are known for their fair pricing policy (in some cases low or even no fees for initial consulting are especially appreciated);

- TDACs are regarded as an interesting alternative to other forms of consulting on the market. According to the firms questioned, the consulting service offered by the TDACs was more significant for their decision-making than other sources of information, such as trade fairs or professional journals;
- especially innovative SMEs wishing to employ a new and advanced technology see in TDACs their only source of competent support;
- there seems to be a lack of co-ordination and transparency between TDACs in a country or even at an international level.

4.6 Regional Orientation in TDAC Establishment

Initiatives for the establishment of TDACs started in some countries (e.g. Germany and France) on a regional level. Regional government (sometimes supported by some policies of the national government) and local institutions saw a demand for activities which would improve technology transfer to local or regional enterprises or institutions. These activities concentrated on technologies relevant to the industry or the characteristics of the region. An excellent example for a TDAC in a less favoured region in Germany was found in the most northern state of Germany (Schleswig-Holstein). This TDAC was set up to introduce advanced information and communication technology to the local industry in order to keep it competitive with industry in more centrally located regions of the country.

In some cases the initial impulse for the establishment of a TDAC came from institutions or organisations already active in an advanced technology field (examples can be found of German TDACs associated with research organisations and Universities). Support for these centres came from local and regional bodies. Often the objectives of these TDACs were not only to promote technology transfer to SMEs but to expand their own activities into new technical fields.

A critical point in regionalisation of TDACs is the degree of specialisation achievable and the critical mass of customers in advanced technology fields. A compromise was tested in the CIM centres of the German Production Engineering Programme which were established in every German state. They were supposed to provide basic demonstration of (and advice on) computer integrated manufacturing but were each specialised at the same time in a particular CIM subtheme such as production planning and control or knowledge engineering. Unfortunately, available information does not tell in how far these particular offers have attracted clients from other regions or if clients stuck to the nearest CIM centre.

An analysis of the survey results and the interviews has not produced sufficient concrete evidence that TDACs contribute measurably to the development of a region. Due to a lack of assessments of TDAC activities only very limited and inconclusive information could be obtained. The impact of TDACs on regional development especially in the weak regions as defined by the EC is an area where additional research will be needed to obtain sufficient and conclusive data. A basis for such work could include a comprehensive survey of the clientele of active TDACs in the context of an evaluation study.

4.7 Demand Assessment and Demand Orientation

The establishment and operation of TDACs are usually supply-oriented. The scope of the range of services offered and the type of technology demonstration and technology transfer are based primarily on assumptions and not on reliable information on the actual needs of the potential customers. In not one single case study could studies be detected which aimed at estimating the demand potential for TDAC services or identifying potential customer groups, as well as their need for information and information behaviour patterns. This strong supply orientation has impacts on the demand for TDAC services and the use of demonstration centres. This applies above all to technology-centred TDACs and those which are linked organisationally to a research or university institution.

Knowledge about customers and their needs for technology-oriented demonstration and consulting tends to be less widespread in the technology-centred TDACs than in the sector-centred TDACs. The reasons are, among other factors, that the services offered by the technology-centred TDACs are not directed at one particular branch as a rule and thus by comparison with the sector-centred TDACs the target group is less homogeneous. Furthermore, the sector-centred TDACs, are much more strongly linked to the diffusion of a particular technology than is the case with the sector-centred establishments. As a rule, the relationship between customer and TDAC is not of a long-term nature. This makes the collection of information about the relevant target group and the implementation of adequate measures very difficult.

Institutions which offer their activities as an organisational unit of a university or research facility are often closely linked to the technology-oriented type of TDAC. Sometimes the technological and scientific reputation of these institutions acts as an inhibiting barrier to small and medium-sized enterprises (SMEs). The acceptance, especially by SMEs, of universities and public research institutions as competent providers of practice-oriented

solutions to problems is sometimes low, due to the often felt lack of practice and branch orientation.

TDACs on the one hand are challenged to provide high technological competence which enables them to offer the relevant demonstration and consulting services in the first place. On the other hand, they are also called upon, with the view of a wide and rapid technology diffusion to SMEs, to prove their close proximity to industry and to apply their experience to practical cases. An approach to solving this dilemma could lie possibly in a stronger demand orientation in the pre-establishment phase of TDACs. The more systematic and the closer to reality the need for technology demonstration and consulting services will be determined, the greater will be the probability of a market-relevant offer. In numerous countries practical methods to analyse the demand potential are lacking[2].

4.8 The Timing and Integration of Technology Demonstration in the Context of Broader Technology Programmes

The effectiveness of TDACs within the national innovation system is influenced by two factors in particular: first, the timing of the launch of technology demonstration and application activities in relation to the diffusion and degree of maturity of the technology in question. Second, the conceptional and chronological co-ordination of state promotion measures for TDACs with other technology policy measures (e.g. for the diffusion of certain technologies).

A basic prerequisite for the technology transfer within SMEs is a high degree of maturity in the technology itself; this means, that for the enterprise the risk of adopting it is a calculable one and the resources necessary for implementation will not exceed the capacities at its disposal. That a low degree of maturity in the technology can detract from the effectiveness of TDACs - at least with a view to speeding up the diffusion - , could be seen in Germany in the example of publicly promoted demonstration centres for synthetic fibres. The degree of maturity of the fibre technologies was not sufficient, inspite of the establishment of seven

2 cf. Muller, E./Gundrum, U./Koschatzky, K.: Methodology in Design, Construction and Operation of Regional Technology Frameworks: Needs analysis of innovation and technology support requirements of firms within a region. First results. FhG-ISI, Karlsruhe 1995.

demonstration centres, to give the diffusion process within small and medium-sized enterprises the originally anticipated impetus[3].

Besides the degree of maturity of the technology demonstrated in TDACs, the conceptional and chronological co-ordination of state support for TDACs with other national and even regional technology policy measures is of great importance to the effectiveness of demonstration centres. The following example from the Federal Republic of Germany illustrates this. In 1983 a TDAC was set up to demonstrate CAD/CAM technologies[4], on the initiative of the Federal Ministry for Research and Technology (BMFT). This measure was a part of the national technology transfer activities. This programme to promote CAD/CAM technologies, which was initiated in 1984 by the BMFT and administered by the project „Production Engineering", engendered a great need for information on the performance potential and application possibilities of this relatively young technology in industry. The demand for the demonstration and consulting services offered by the CAD/CAM laboratory was therefore extraordinarily high in these initial years. With the increasing diffusion of CAD/CAM technology in Germany and the decrease of the government promotion for it, the demand for the services offered by this TDAC dropped successively. Although the conceptional and chronological co-ordination of state technology promotion and public support for technology transfer activities was regarded a major success factor, both by policy makers and TDAC management, up to now it has only been encountered in exceptional cases in the member countries.

3 cf. Behringer, F. et al.: Demonstrationszentren für Faserverbundkunststoffe (FVK). Ergebnisse der Begleitforschung. Gutachten im Auftrag des Bundesministeriums für Forschung und Technologie. Berlin 1994, p. 185 ff.

4 CAD/CAM: Computer Aided Design/Computer Aided Manufacturing

5 Policy Recommendations and Conclusions

The results of the study have shown that TDACs with their demonstration activities form a stand-alone institution in the range of technology transfer bodies and can play an important part in an overall strategy of technology and innovation transfer. TDACs have focused their actions on SMEs and have succeeded in attracting a clientele mainly from small firms (almost ¾ of them have less than 50 employees). TDACs have thus at least partly succeeded in addressing enterprises which traditionally are a major but difficult target group of technology transfer processes. These enterprises in fact appreciate the TDACs in particular for their skills in monitoring technologies, their neutrality, their usefulness during the feasibility-adaptation phase and their reasonable cost.

Different types of TDACs exist which fulfil different types of mission: Technological development, awareness/illustration of advanced technologies, feasibility/adaptation of new technologies for SMEs, integration of new technologies within SMEs. Obviously these cannot all be evaluated in the same manner. The adopted missions (represented by different activities) and also the orientation of the TDAC (development or integration of the technology) necessitate different strategic issues (financing structure: balance between private and public, type of technology demonstrated, profile of technicians, target groups, partnerships, ...) and, as mentioned above, different evaluation criteria (the level of diffusion of the technology cannot be the same for each type).

TDACs projected the financing of investments and personnel to be their major bottleneck for the next years. There are, however, indications that the decrease in financial support from public bodies can be compensated by income from fees for services. It is thus believed that no action will be necessary at the European level.

The focus of TDAC activities differs significantly across countries within the EU. National support policies, although present in most countries, are usually embedded in broader policies on technology transfer. A general policy on demonstration activities and the strategy of TDACs could not be identified. This is believed to be one of the weak points recognised in the study which needs future attention. The EU could play a role in the co-ordination of approaches to develop further the instrument of technology demonstration (and TDACs in particular) as an element of national and European technology policy.

TDACs in fact, are only one tool of demonstration amongst many, but none of the countries analysed, appear to have a global view of demonstration activities. Although the countries have developed some specific schemes, in general they only cover a part of the problem.

Such schemes cover the launching of TDACs (F, B, D), financing demonstration investments within firms (I, F, DK), inciting firms to demonstrate some of their integrated technologies (UK, G, E).

This chapter presents policy issues which were identified in the study and lists possible actions to be taken at the European level. Some of the measures discussed are suitable for application at both the national and the European level. The recommendations regard five areas:

- Networking and exchange of experiences of TDAC actors.
- Promotion/marketing of TDAC services.
- Reinforcement of demand orientation.
- Improvement of performance assessment and evaluation of TDACs.
- Co-ordination and further development of technology demonstration as an integrated element of technology policy.

1. Networking

The study has revealed that although there is some exchange of information between TDACs at the national level and also to a lesser degree at the European level, no systematic activity to share experience or know-how could be identified. Unlike other technology transfer bodies as technology parks or CROs TDACs do not yet have a regular platform on the European level. International activities, as the study showed, are of interest to TDAC and should be further developed. An idea would be a European exchange programme for TDACs which could not only extend demonstration activities and promote technology transfer across regional and national boundaries but would also provide an excellent way to exchange experiences between TDAC management and staff. This would lead to an improvement of the individual TDAC work and management. The exchange programmes should be supplemented by periodic seminars or workshops providing a platform for the discussion of relevant issues not only for TDAC managers but also leading actors from other demonstration and technology transfer actions.

The benefit of European co-operation in the field of demonstration is well illustrated by the initiatives of governments in several EU countries to support visiting schemes inside successful enterprises. The programme was started in the UK (Inside UK Enterprises) and taken over in Germany (TOP) and Spain (TOP/ADEGI).

2. Promotion/Marketing

The awareness of TDACs and their services is a prerequisite for the subsequent use by SMEs. Promotion of their activities is thus a very important issue for TDACs. In Chapters 3 and 4 it was shown that TDACs publicise their services and expertise through a number of channels. In general this activity is limited to a regional or to some extent also a national range. However, even if the international coverage by TDAC activities is fairly small, some TDACs have succeeded in diffusing their activities at the international level. The success of these few TDACs justifies the issue of promoting TDACs at the European level.

The mission of most TDACs is to focus their activities on SMEs as a target group. It is, however, a difficult task to convince small enterprises that the technologies demonstrated are not only for large firms but that the TDAC services offered are especially tailored to meet the needs and requirements of SMEs. Demonstration has to be designed in a way that will convince clients that they can use the technology in their production environments. It should become clear to them how they can benefit from the new technology. Best practices have to be identified or developed to be employed by all TDACs. This could be a field for actions on a European level in two directions:

- generate awareness of TDAC activities and
- develop and initiate best practice promotion methods.

Support from the European Commission in this area will be especially important as awareness campaigns on a European level under the patronage of the EC have more leverage and will reach larger target groups in all regions of the EU. Given the already growing relevance of European customers and European funds (e.g. through participation in co-operative research projects) for TDACs they should be taken as a starting point or tool for improved European co-operation.

The TDAC survey has shown that demonstration activities cover a wide range of technology fields with an overall (European) concentration on production /manufacturing technologies. At the country level the focus varies somewhat (e.g. energy and agricultural technology in the Netherlands; electronics, communication, and information technology in Ireland). Technologies demonstrated very often represent 'popular' systems or processes which are geared for target groups of sufficient size. TDACs rarely demonstrate new technologies for which an expected critical mass of clientele is missing. Although more advanced and innovative technologies for (initially) small target groups are possibly demonstrated in some countries, the radius of effectiveness remains small. A European approach could help to provide interested firms throughout the EU access to new and innovative technologies.

The establishment (approvement) of a number of reference demonstration and application centres (RTDACs) installed across Europe at high-tech organisations possessing the necessary expertise could provide the required support for companies to orient themselves towards new (at first possibly 'exotic') and advanced technologies at the state-of-the-art level. The support of such a system at the European level would assure that firms from all regions of Europe could access these reference points (RTDACs) and could benefit from the same high standard of technological development. 'Reference Points' could compensate weak points in national or regional demonstration infrastructure.

In addition to the idea of RTDACs a European directory of TDACs could be drawn up which would serve general marketing purposes as well as support European co-operation. It could be well targeted at SMEs and enhance the visibility of TDACs at the international level both in the field of technologies which are either already widely diffused or those which are new and innovative.

3. Orientation to Client Demand

Generally TDACs were established and managed based on a supply-oriented strategy. There often is little known about the demand side of demonstration activities and services offered. Questions like 'How much information do companies need?' or 'What kind of information are firms looking for?' have not really been answered. Ways to remove this deficit especially before the establishment but also during the active phase of TDACs have to be analysed and solutions developed. The integration of these procedures in technology transfer policies should be a goal both at the national and the EU level.

A role for EU could lie in the

- joint development of guidelines for the assessment of client demand
- the identification of best practice rules for the design of demonstration activities based on client demand
- in the promotion of the integration of the above two measures in technology transfer programmes at the national and the European level.

4. Evaluation and Performance Assessment

Depending on the adopted missions and the orientation of a TDAC (e.g. technology, application, or sector centred), different strategies (financing structure, type of technology demonstrated, target groups, etc.) will be significant. Accordingly the evaluation criteria will differ depending on the mission. Some TDACs will be initiated ahead of the marketing of a technology i.e. at the end of the research and development stage (at the beginning of the diffusion cycle). Others will pick up a technology that has already achieved some market

penetration. Accordingly the type of clientele to be addressed will vary between avant-garde firms and followers respectively.

Evaluation of a TDAC with respect to its effectiveness within a technology transfer and innovation policy is thus very difficult and as of today has generally not been undertaken by TDAC's management or public bodies. On the other hand it is important for policy makers to have a reliable and comparative information in order to rate and compare the performance of TDACs with other institutional measures. A prerequisite for any assessment are suitable evaluation methods which would produce tangible and objective results. Due to the diversity of TDACs (in their missions, strategies, etc.) evaluation criteria will be quite complex. A crucial aspect is the impact on industry and therefore current and potential customers have to be considered in any approach or methodology.

The evaluation of TDACs is not only a national objective but is of importance to all members of the EU. A joint action could thus be appropriate with the following objectives:

- development of appropriate evaluation procedures which would among others consider the different categories of TDACs and their respective missions and target groups,
- initiation and support of actions for the assessment of TDACs in selected fields and regions to identify best practice within the EU,
- collection and exploitation of existing approaches in the evaluation of (technology transfer) institutions.

5. Further Development of Technology Demonstration Policies within the EU

A survey of national demonstration policies and interviews with policy makers has shown that some form of government support has been given to TDACs in the past in almost all EU countries (and also in Japan and the USA) which implies that policies have existed for demonstration activities respectively that different technology programmes have partly refereed to demonstration as a means of technology transfer. These actions have, however, in general been rather isolated and focused on particular technologies. Little or no cross-fertilisation has taken place between individual measures (not only at the European but in some cases also at the national level). A comprehensive concept of the role of technology demonstration in technology (transfer) policy is largely missing.

Complementary to the policy actions proposed above the European Union could play a role in the co-ordination of the national (and even regional) demonstration policy actions within the EU. This would result in a more efficient use of resources (existing redundancies could be eliminated) and would lead to an improved and more focused initiation and management of demonstration activities throughout the EU. Harmonised actions would improve the

timing and synchronisation of demonstration activities to the diffusion process of a new technology within the EU. It will be important to realise that demonstration activities are an important part in the chain of technology transfer and innovation support instruments available and as such should form an explicit element in technology policy. Not least, as policy makers via TDACs and their range of services could also help to promote complementary assets for innovation (market surveys, organisational innovation, production management methods, training, ...).

The question if and how TDACs could be valorised for dissemination of results of the EU research programmes would need further investigation. Considering the developing involvement of TDACs in EU co-operative research projects and their interest in the acquisition of additional funds (e.g. via new European customers) there seems to be some potential.

Annex A

TDAC Support Policies and Schemes

Public schemes in the field of technology demonstration and application in the European Union

Country	Scheme	Aim of scheme	Sector/Technology	Demonstration approach	Funding	Operation since/to
Denmark	No relevant activities					
France	Demonstration Operation (OD)	Development of techniques, processes and materials	energy	Firm-to-firm-demonstration	ADEME (Agency of Energy and the Environment)	1975-1992
Germany	Micro-systems technologies	Technology diffusion	Industry/micro-systems, microperipherals	Centre-to-firm-demonstration	National Government (Federal Ministry of science and technology)	1990
	Production engineering	Technology diffusion	Industry/production, ICT	Centre-to-firm-demonstration	National Government (Federal Ministry of science and technology)	1988-1992 and 1992-1995 (new Länder)
	Materials research	Technology diffusion	Industry/materials	Centre-to-firm-demonstration	National Government (Federal Ministry of science and technology)	1988
	Technology-oriented visiting and information programme (TOP)	Experience transfer	All industry sectors	Firm-to-firm-demonstration	National Goverment (Federal Ministry of Economic Affairs)	1992

Country	Scheme	Aim of scheme	Sector/Technology	Demonstration approach	Funding	Operation since/to
Great Britain	Inside UK Enterprises (IUKE)	Experience transfer	All industry sectors	Firm-to-firm-demonstration	Department of Trade and Industry (DTI)	Early 1990s
Greece	PAVE-2	Innovation and technology transfer	All industry sectors		National Government	
	Sub-Programme 2 (part of CSF)	Enhancement of technology transfer mechanisms	All industry sectors		National Government and CCE	
Ireland	Programmes in Advanced Technologies (PATS)	Innovation and technology transfer	Many industry sectors	Centre-to-firm demonstrations	National Government (EOLAS, now FORBAIRT)	Late 1980s
Italy	Technology Innovation for enterprises	Demonstration of new technology	• Ceramics/new materials • Laser, electron beam • CAD/CAM • Simulation software	Firm-to-firm demonstration	ENEA/Ministry of Industry	

Country	Scheme	Aim of scheme	Sector/Technology	Demonstration approach	Funding	Operation since/to
Netherlands	Firm-directed technology stimulation (PBTS)	Technology diffusion	• Informations technologies • Materials • Biotechnology • Environmental technology	Firm-to-firm-demonstration	SENTER	1987
	Arable farming 2000	Diffusion of ecological farming approaches	Agriculture	Farm-to-farm-demonstration	Ministry of Agriculture, Nature Management and Fishery (Dutch Extension Service (DLV))	1993-1996
Portugal	PEDIP II	Programme for the development of industry	All industry sectors	Firm-to-firm and centre-to-firm	Ministry of Industry and Energy (MIE)	1994
Spain	Technology-oriented visiting and information programme (TOP)	Experience exchange	All industry sectors	Firm-to-firm-demonstration		

Annex B

Technology Demonstration in Technology or Science Parks

Technological Demonstrations in Technology Parks in the European Union

A further, smaller study was carried out in France concerning technological demonstration activities in the Technology Park population. Although this population had originally been excluded from the principal TDAC survey, we still wanted to test the level of involvement of these parks in demonstration activities. The objective of this study was not therefore to identify the demonstration activities of the parks, but simply to test whether such activities had a role in their structure.

A total of 72 questionnaires were sent out from which 16 replies were received.

Of the 16 replies :

7 parks had some form of demonstration activities

- **Espace Scientifique et Technologique d'Echanges et de Recherche**, Limoges*
- **ANTICIPA Technopole**, Lannion
- **PROMOTECH**, Villiers Les Nancy *
- **ACROPOLE Services**, Agen *
- **ADRIAC**, Reims
- **ATLANPOLE**, Nantes
- **CEREM**, Grenoble

7 parks had no demonstration activity

2 parks carried out demonstrations but purely in a commercial aim

Parks with Demonstration Activities

- For most of these parks, demonstration activities were launched in the early 1990s
- 3 parks claimed that demonstration activities were a "very important" activity for their park (indicated by an asterisk in the list above)
- The demonstration activities concern :
  - the promotion of new technologies
  - the demonstration of techniques in order to increase their diffusion within industry
- 6 of the parks indicated that their activities of demonstration were to some extent financed by Regional authorities
- The principal tool used to realise these demonstration activities is that of physical models/prototypes of new technical systems
- The two principal channels of promotion/diffusion used are mailings and participation at conferences
- For the majority of these Science Parks, their client base is made up of local/regional SMEs which come from specific sectors

Parks with no Demonstration Activities

- Reasons for not having demonstration activities identified from the survey include :
  - The lack of structure or human resources to take charge of such activities
  - The lack of financial resources
  - The park did not feel that its activities loaned themselves to demonstration activities

Conclusions

- From the survey, it can be said that Technology Parks are involved to varying degrees in demonstration activities, some much more than others and in fact, are capable of helping enterprises through these activities.
- It apears to us from the study that there is an issue at stake that needs further investigation : what the demonstration activities actually involve and how these can complement the activities of the TDACs identified in the principal study.

Demonstration Activities in Technology Parks in Germany

A total of 50 technology parks were sent a short questionnaire to determine whether these centres are engaged in demonstration activities. The results of the 26 centres responding are summarised below.

Demonstration of Technologies:

yes	13	(50%)
no	13	(50%)

How does your Institution demonstrate Technologies?

via systems/equipment	4	(30%)
via physical models or media-based representation	9	(70%)

How are the demonstration activities financed?

Public Funding	1	(8%)
Self-Financing	5	(38%)
Self-Financing and Public Funding	3	(23%)
Self-Financing and Suppliers	3	(23%)
Suppliers	1	(8%)

When were the demonstration activities initiated?

≥ 1985	2	(15%)
1986 - 1990	2	(15%)
1991 ≥	8	(62%)
no answer	1	(8%)

Annex C

Examples of Different Types of TDACs

Example of a Sector-oriented Centre

INESCOP CENTRE	
Status :	Industrial Association
Year of creation :	1971
Annual Turnover :	3.8 million Ecus (1993)
Initial Investment :	Regional and National Public funds, suppliers, users and self-financing
Budget sources :	Public core funding (25%), fees for services (40%) and Membership fees / donations (35%)
Principal activities :	Demonstration of advanced technologies, R&D, testing & certification, training in the use of a technology, technical assistance, short term consulting.
Technological domains :	Manufacturing technologies - rapid prototyping, CAD/CAM, cutting with water jets, Materials and Electronics, Communications and Information technologies.
Demonstration method :	Systems from different suppliers and media-based representations Systematic promotion principally through participation at conferences.
Total number of staff :	87
Client Base :	Total clients : 520 100% have less than 50 employees Shoe sector (100%) 100% national

Example of a 'Pure' Demonstration Centre

DEMO CENTER	
Status :	Independent Unit (Regional Development organisation)
Annual turnover :	400,000 Ecus (1993)
Initial Investment :	Regional Public funding and Suppliers
Budget sources :	Public project funding (90%) and fees for services (10%)
Principal activities :	Demonstration of advanced technologies
Technological domains :	Electronics, Communication and Information technologies, Manufacturing technologies.
Demonstration method :	Physical models or prototypes of technical systems and media based representations. Systematic promotion of TDAC services through mailings and personal visits
Total number of staff :	8 (5 technical, 2 administrative, 1 management)
Client base :	Total clients : 50 80% have less than 50 employees Local / regional origin (90%)

Example of a 'Development' Centre

CRIF - METAL
(CENTRE DE RECHERCHES SCIENTIFIQUES ET TECHNIQUES DE L'INDUSTRIE DES FABRICATIONS METALLIQUES)

Status :	Independent unit
Annual Turnover :	1.3 Million Ecus (1993)
Initial Investment :	Regional, National and European Public funds
Budget sources :	Public core funding (50%), fees for services (20%) and Membership fees / donations (30%)
Principal activities :	R&D, assisting firms, short term consulting
Technological domains :	Materials, Manufacturing technologies Electronics, Communications and Information technologies,
Demonstration method :	Systems from different manufacturers, physical models/prototypes of new technical systems, Systematic promotion of services through participation at conferences
Total number of staff :	140 (115 technical, 25 administrative)
Client Base	Total clients : 790 60 % have less than 50 employees 100 % national origin

Brief description of the main activities :

The CRIF Metal centre is an example of a Sectorial Technology Centre which works in the sector of metal manufacturing. It demonstrates CAD-CAM, injection, foundry, robotics and numerical machining by using equipment and prototypes. The aim of the centre is to exhibit or demonstrate the full range of the current "promising" technologies.

Example of an 'Integration Centre'

Pôle de Plasturgie de l'Est (St Avold)

Status ;	Part of a large industrial association
Annual Turnover :	305,000 Ecus (1993)
Initial Investment :	Regional, European and National Public funding
Budget sources :	Public core funding (50%) and fees for services (50%)
Principal activities :	Open-days, training in the use of a technology, assisting companies, ...
Technological domains :	Manufacturing technologies, (Resin Transfer Moulding technologies for comosite materials) Materials,
Demonstration method :	Physical models or prototypes of technical systems No systematic promotion of TDAC services, although the centre does produce a newsletter
Total number of staff :	7 (5 technical, 2 administrative)
Client Base	Total clients : 30 33% have less than 50 employees Local/regional origin (75%)

Brief description of the main activities:

Different from the IREPA-Laser centre, the 'Pôle de Plasturgie de l'Est' (P.P.E.) is not centred on a particular technology or the demonstration of it. This centre provides the plastic-transformer industry with technical assistance in their activities. Equally, it dedicates a lot of ist time to the continuous training of the employees of this industry. Equipped with the latest up-to-date materials and machinery (the only equipment of ist type available in France), the P.P.E. has acquired different expertise in the field of Resin Transfer Moulding technology.

This technology, developed within the aeronautic industry ten years ago and now beginning to find ist way into more traditional sectors, allows industry to work in closed moulds thus limiting the level of solvent in the air. The new European regulations in theory should impose this new technology which offers numerous benefits, such as gains in productivity.

The P.P.E. centre is very well informed and up-to-date on the various stakes in the plastic-transformer industry and has fixed for itself the objective of preparing enterprises within the plastics industry for the future evolution of their industry. In the light of this, it has developed a demonstration activity which at the request of ist client, leads it fairly often to be actively present and intervene right up to the launch of the first production series.

Technology Demonstration and Application Centres in the EU

Proceedings of EIMS Policy Workshop Luxembourg, 11-12 May 1995

September 1995

Technology Demonstration and Application Centres in the EU

Proceedings of EIMS Policy Workshop
Luxembourg, 11-12 May 1995

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I. INTRODUCTION

Complementary to a study on the distribution, characteristics, and role of Technology Demonstration and Application Centres (TDACs) in the European Union initiated within the framework of SPRINT EIMS a two day workshop was organised by the EC and the Fraunhofer Institute for Systems and Innovation Research (FhG-ISI) in May 1995.

The main objective of the workshop was to provide a forum for discussion initiated by statements from experts in TDAC policy and management. The workshop contributions were grouped into sessions and themes according to the major issues on TDAC policy and management which were identified in the above mentioned study. An additional session was dedicated to the company visiting schemes currently being implemented in some EU countries.

This form of workshop organisation was to some extent an experiment as it did focus on the presentation of particular programmes or approaches in the field of technology demonstration but tried to concentrate from the beginning on a number of relevant questions and problems concerned with TDAC policy management and demonstration activities in general.

The workshop was attended by more than 45 persons representing TDACs, government bodies, research organisation, and firms. After an introduction by R. Miège from the Commission a summary of the results of the TDAC study set the scene for the following presentations by speakers from TDAC management, policy makers, and researchers. In addition to a coverage of the European countries an overview was also presented by Prof. Shapira of Japan and the USA.

The following pages contain the summaries of the speaker presentations. They are organised according to the agenda. A list of the participants is included in Annex C. The results of the TDAC study are described in some detail in the first part of this volume. A brief overview with some conclusions of the workshop sessions is given in part 1 of these proceedings.

II. AGENDA

European Innovation Policy Workshop

TECHNOLOGY DEMONSTRATION AND APPLICATION CENTRES (TDAC) IN EUROPE

Luxembourg, 11th and 12th May 1995

Jean Monnet Building - Room M5, Plateau du Kirchberg

Agenda

THURSDAY 11th MAY

10 H 00 **Registration**

10 H 30 **Welcome and Introduction** Mr. R. Miège - DG XIII D-4

10 H 45 **SESSION 1: SETTING THE SCENE: TDACs IN EUROPE**

1. Survey of TDACs in Europe 1994

Major results of the TDAC survey will be presented covering such aspects as regional distribution of TDACs, technology fields occupied, main clientele, services offered, differences within the EU.

Dr. W. Hudetz, FhG ISI (D)
Mr. N. Kandel, CM (F)

Comments and Debate

2. Cases from different technology fields and different countries

Presentation of a TDAC activity in the field of CAD/CAM/CIM.

Mr. David Walsh, Waterford CAD (IRL)
Ms Monika Forti, Demo-Center (I)

Comments and Debate

12 H 30 **Lunch**

14 H 15 **3. TDAC related policies in Europe**

A brief overview of past and present policies on demonstration activities to support technology transfer and a specific example from the UK will be presented.

Mr. Jürgen Wengel, FhG ISI (UK)
Dr. Steve Jones, The Welding Institute (UK)

Comments and Debate

15 H 00 **SESSION 2: MANAGEMENT ISSUES**

4. The range and combination of TDAC services

The demonstration of technologies and their application possibilities alone do not provide a sufficient basis for a TDAC. A range of integrated services including training and counselling (not only on technical but also on organisational and economic issues) have to be offered. Examples of promising portfolios will be presented. Promotional policies will also be looked at.

Mr. Scheff, FhG (D)
Mr. Jean-Claude Moretti, Conseil Regional de Lorraine (F)

Comments and Debate

16 H 00 **Coffee break**

16 H 15

5. The management of change

The development of technology-oriented TDACs follows the diffusion curve of the respective technology. This connection has implications for demand, types of clients, services offered, major bottlenecks, etc. of TDACs. Every diffusion phase needs a specific management of the TDAC and specific policy approaches. Management and policy implications (e.g. financing, marketing, range of services) of the life cycle of a TDAC will be discussed.

Mr. Juan Carlos Soriano, AIDO (E)
Mr. Alexandre Silva, GEP Ministry of Industry (P)

Comments and Debate

17 H 30 **Closing**

19 H 30 **Dinner**

Speech: *Technology demonstration activities in the USA and Japan.*
Mr. Philip Shapira, Georgia Tech. (USA)

FRIDAY 12th MAY

9 H 00 **6. Sector- versus technology-centred approaches.**

Two major orientations of TDACs have been identified in the study: sector-centred and technology-centred. Each case has different implications for the management of a centre and for policy makers. National experiences will be discussed including specific advantages and disadvantages.

Mr. G. Jones, Water Research Centre (UK)
Mr Lemeur, IREPA Laser (F)

Comments and Debate

9 H 45 **SESSION 3: TECHNOLOGY DEMONSTRATION IN ENTERPRISES**

9 H 45. schemes. **7. Examples, justification and perspectives of company visiting**

Demonstration activities within firms are exemplified by the "Inside UK Enterprises", the German "TOP" programme and the "TOP" programme of ADEGI in Spain. Presentations will be given on the transfer of management best practice, the exchange of of experience between enterprises, innovative co-operation at the regional level, and case studies.

- Transferring management best practice: Inside UK Enterprises
  J. Launchbury, DTI, (UK)
- Exchange of experience between companies: The German TOP programme
  Dr. C. Brebeck, BMWI, (D)
- Innovative co-operation at the regional level: The TOP programme of ADEGI in Spain
  José Maria Ruiz Urchegui, ADEGI, (E)
- Presentation of the French scheme, "Reference".
  Mr. Charles-Etienne Thomas, ADEPA (F)
- Current achievements: Case studies and results
  Jaione Iñarrairaegui Mayora, ADEGI, (E)
  R. Jennings, IFS, (UK)
  M. Vowinckel, IMK, (D)
- Proposed developments and perspectives
  Dr. C. Brebeck, BMWI (D)

Comments and Debate

10 H 30 **Coffee Break**

11 H 00. **7. Examples, justification and perspectives of company visiting schemes.**
Continued

12 H 30 **Lunch**

14 H 15 **SESSION 4: POLICY ISSUES IN TECHNOLOGY DEMONSTRATION**

8. Timing and integration of demonstration-based technology transfer

The timing and the establishment of TDACs (with respect to the innovation cycle) and the integration with other policy measures were shown to be an important success factor of public policies. Different national experiencies with the timing and integration of technology demonstration and application activities will be presented and discussed. This will also include a shift of the emphasis in support frrom pure technology to organisational and economic aspect

Mr. Luigi Lesca, ENEA (I)

Comments and debate

9. Demand orientation in technology demonstration activities

Generally TDACs were established and managed on supply-oriented basis. There is little known about the demand side. Questions like "How much informatioon do companies need?" or "What kind of information are firms looking for?" have not really been answered. Ways to remove this deficit especially before the establishment but also during the active phase of TDACs will be presented. The integration of these procedures in technology transfer policies will be discussed.

Mr. Ken Guy, Technopolis, (UK)
Mr. Yves Hellot, ADEME (F)

Comments and debate

15 H 15 **CONCLUSIONS AND OUTLOOK**

Mr. R. Miège - DG XIII D-4

16 H 00 **End of Workshop**

III. WELCOMING ADDRESS

Mr. R. Miège, European Commission, DG XIII/D/4, Luxembourg

This workshop is the third activity of its kind within the EIMS framework programme. The goal of these workshops is to bring together three types of persons. The 'grass-roots' persons who work in the field, political decision makers who decide on public support in member states, and academic consultants who observe and comment. These three categories of persons should deliberate on subjects which are topical and could be changing rapidly. Other topics could be of a more exploratory nature and some could even pose problems to some or all of the persons concerned. Thus these workshops have been very varied. Some of them have looked at public measures to support e.g. the growth of new technology based firms, the transfer of knowledge, the increased participation of workers in innovation projects, the development of research and technology centres, etc. I am sure that some of you have participated in some of those workshops before.

Today's workshop shall look at demonstration centres, i.e. at demonstration and application centres in Europe. For a brief glimpse outside of Europe Prof. Shapira will present an overview of the situation in the US and Japan. Apart from that we shall hear about European technology demonstration and application centres and techniques and the policies concerning these activities. Technology demonstration means to present technologies which already exist, to demonstrate them, show how they work and how they could help firms and potential users. This process could potentially take place by using firms. It may seem a bit strange to hear the term 'technology demonstration' together with what we call 'technology push'. Today 'technology push' doesn't enjoy a very good reputation as you are probably aware of and there is considerable rethinking going on about how one should handle issues in the area we are working in. What can be done with regards to stimulating or encouraging demand, encouraging interaction between the various players involved i.e. producers, users, and associated services. Demonstration might be understood as being a bit out of date and belonging to the past. However, surprisingly more and more demonstration is happening and the study which will be reported on in a moment does show very clearly that over the last ten years many new centres have been set up in Europe. Also policies encouraging dissemination of technology encourage demonstration activities. I believe that this is a response to a need that has been perceived in the past. There is thus the perception of a need or demand for demonstration of very rapidly changing technology. It is very important to help firms to use and apply new technologies and techniques. It is a question of the competitive edge. Public authorities, therefore, actively support the use of new technologies utilising demonstration as a vehicle.

Over the last few years there has been an interrogation into the question of technology push, as I have already mentioned. At the same time there exists considerable pressure to try and insure that technologies developing at very high speed, with ever shorter life cycles, will be applied before they are out of date. Thus public interest exists in encouraging instruments facilitating demonstration but not just demonstration in the old sense or showing that something does work technically or how it works, but also demonstrating its economic advantages, how

to use it, and how to fit it into the co-operate environment. There are different demonstration methods used, one of them is what we shall look at for the next couple of days: to create centres with the purpose of delivering the service which I have just been describing. A stimulation by example is another instrument which means organising visits to companies. In fact tomorrow we shall have a whole session on public programmes encouraging demonstration by example i.e. on the site visits to see technology at work. With this I would like to close this introduction. I shall pass the floor over to Dr. Hudetz from Fraunhofer-ISI, Karlsruhe and than to Nicolas Kandel from Central Management, Paris. They will report on an extensive study on technology application and demonstration centres (TDAC) in the EU.

Session 1: Setting the Scene: TDACs in Europe

1.1 Survey of TDACs in Europe 1994

Dr Walter Hudetz, FhG-ISI (D)
Mr Nicolas Kandel, CM (F)

(These two presentations were taken from the TDAC study documentation and are included in Part 1 of this volume)

1.2 Cases from Different Technology Fields and Different Countries

Mr David Walsh, Waterford CAD Centre (IRL)
Ms Monika Forti, Demo-Center (I)

1.3 TDAC Related Policies in Europe

Mr Jürgen Wengel, FhG-ISI (D)
(This presentation was taken from the TDAC study documentation and is included in Part 1 of this volume)

Dr. Steve Jones, The Welding Institute (UK)

Session 1: Setting the scene: TDACs in Europe

Mr. David Walsh, CAD Waterford Centre, Ireland

THE DEVELOPMENT, HISTORY AND ACTIVITIES OF THE WATERFORD CAD CENTRE

Location

For industry planning and administration, Ireland is divided into regions and the Waterford CAD Centre is located in the South-East.
Regional Population = 300,000: Largest Population Centre = Waterford at 45,000.
Industry is mainly in Metal Working, Mechanical Engineering, Food Products and Health care.
There is little Electronics or Clothing.
80% of companies employ less than 50 people and the largest single manufacturing employer (Waterford Crystal) employs approximately 1500 people.
Third level educational establishment.
Waterford Regional Technical College (WRTC) - 4000 full-time students (6000 full and part-time students). The College offers a range of Diploma, degree and Post-Graduate courses in Engineering (Manufacturing, Civil & Building, Electronics), Sciences, Business, Arts and Music.

Concept 1989-1990

Forbairt - the Irish Agency for Science & Technology (previously EOLAS) has established that South-East Ireland when compared to the national averages, was low in technology application in industry. It was also accepted that Ireland was below the European averages in this respect.
In the late 1980s Forbairt attempted to push technology application, particularly CAD/CAM but had little success. The main reasons given by SMEs for the slow implementation of CAD/CAM were

- A low level of knowledge in SMEs and a lack of confidence in their own technological ability to introduce CAD/CAM.

  It should be noted that many SMEs were operating sophisticated CNC machine tools.

- A lack of confidence in CAD and CAM hardware and software vendors to provide good solutions.

The SMEs suggested that a source of independent expertise and help would be of significant benefit. The WRTC, at the invitation of Forbairt, put forward a detailed operational and financial plan for a CAD centre. Negotiations between the WRTC and Forbairt went on for 12 months.

Waterford CAD Centre was set-up jointly by Forbairt and WRTC and opened for business in September 1991. The manager was David Walsh, seconded from lecturing duties at WRTC. Other staff members to be employed on two year contracts with Forbairt. Temporary staff were employed up to July 1992, when sanction was given for employment of contract staff.
The Centre is housed on an industrial park close to but off-campus

Mission

The Waterford CAD Centre's mission was defined as

- Promote the use and development of CAD industry
- Provide practical assistance to companies introducing CAD
- Support companies to expand and develop installed CAD technologies
- Provide a link to other TDACs
- Become a Centre of Excellence in CAD and CAD based technologies

As the project was seen to have a life of 3 to 4 years, we also set ourselves a objective of

- Becoming a profitable business

Considering the low population density of our geographic region we believed that to be financially viable we would need to develop niche expertises for services which could be sold in other European countries.

Activities

- Advice

This service normally applies to the initial contact with SME wishing to introduce CAD and will usually include demonstration and possibly software/hardware testing.
The client is advised on a suitable hardware and software specification and on the likely development path. We also give contact names for reputable vendors.

- Training

The most important support service for introduction of new technology. In the case of SMEs training should be available locally and be flexible. Training, provided it is good, enhances the "expert" credibility of the Centre. Interest in and demonstration of more advanced applications are also likely to take place during the training period.

- Bureau Services

These include -Drawing and Subcontracting of staff, scanning, plotting, file transfer and general support.
The main purpose is to reduce the lead time to productive implementation and to reduce the initial capital investment by an SME.

- Consultancy
- Software Customising
- Application Development

These services all apply to the development of CAD applications, where a complete off-the-shelf production is not available.

A TDAC'S PRIMARY VALUE IS ITS EXISTENCE

We have found that the most valuable service we provide to our clients is security and confidence. A company, particularly an SME will introduce technologies and applications in the knowledge that assistance is available if needed and the knowledge that they will not be limited by incompetent vendors or their own in-house capability.

Marketing

The thrust of our marketing is to ensure that companies in the region are continually aware of our existence and the services provided.

- Brochures

The CAD Centre has a general purpose brochure to explain the function and services. We also produce a Training Brochure twice a year. This has the advantage that we can mail shot companies regularly.

- "Sales" Visits

We visit companies systematically to explain the services on offer. This also allows us to gain some knowledge of the needs and gives the company a personal contact at the Centre.

- Demonstration and Seminars

When vendors introduce new systems which believe should be of interest to our client companies we will organise demonstrations at the Centre.

- CAD & Technology User Groups

We sponsor a CAD User Group in the region and this is a method of informing CAD practitioners of new or advanced applications.

- Government Agencies

This is important outside our immediate geographic region where companies may not be aware of our services. The local technology office can refer the company to us.

- Journals & Magazines

We have tried advertising in journals but only result has been other journals contacting us to sell advertising space.

Summary 1991-1995

Status	Campus Company
Annual Turnover	250,000 ECU (1995)
Initial Investment	European Public Funds
Budget Sources	Fees 60%
Principal Activities	Advice and Practical Services
Technology Domains	CAD and Information Technologies
Demonstration Method	Systematic Promotion
Total Staff	4 Technical 1 Management 1 Administrative We also use a pool of part-time staff which turns over when a client recruits from the pool

Client Base	98 fee paying (1991-1995) 50 non-fee approximately 80% < 50 employees 90% Local/regional Future growth in business will be outside the region.

Problems

- We have great difficulty in establishing, with the funding agency, the ratio of TDAC activity to fee paying business
- Funding and consequently planning are short term. Staff are recruited on a two year contract.
  This has the obvious problems of maintaining skills and up to date services.
- Keeping up with the latest hardware and software.

TDAC Key Factors

Based on our experiences over the past four years, we believe the key factors for a successful TDAC include

- Appropriate technology

The centre must offer technology appropriate to the SMEs in its region. This may not necessarily be the latest technology. For instance in South-East Ireland there is not one company which could effectively implement CIM.

- Timing

This is in some respects the same as appropriate technology but is the key factor in setting up a TDAC or TDAC function in a region.

- Links to Educational Establishment

A link between a TDAC and a college instils a level of confidence in clients because it ensures that expertise which may not exist in the TDAC is available if needed. Many SMEs have difficulty dealing with academics. We believe that the ideal set-up is the TDAC being part of a college but located off campus and operating as an SME.

- Neutrality

Again an important function of a TDAC is to provide a buffer between the SME and vendors.

- Staff

It is important that the TDAC staff be skilled, but also imaginative. If the TDAC continually offers standard solutions then their function is little better than that of a vendor.

Session 1: Setting the scene: TDACs in Europe

Ms. Monika Forti, Demo Centre, Italy

DEMOCENTER, A REGIONAL TECHNOLOGY DEMONSTRATION CENTRE.

Democenter began operating in 1990. Democenter has been established on the initiative of the 3 main entrepreneurial associations of the Emilia-Romagna region and the ERVET spa - Regional Board for Economic Development.

In addition to the above members, Democenter directly associates Emilia-Romagna enterprises acting in the mechanical, electronic-mechanical, electronic and other fields of the manufacturing industry.

Democenter is located in the basin of Modena. From the beginning of 1993, Democenter occupies a new site consisting of a 1350 square meters plant provided with machinery and equipment for demonstration activities, and an equivalent area for administrative offices, technical departments and other facilities such as training rooms; computer science laboratory, etc.

Democenter employers: 12 internal, 15 external.

The principal aim of Democenter is to increase the competitiveness of SME throughout the diffusion of innovative techniques of manufacturing and production management. The object is to direct the technological development of enterprises towards integrated and organic solutions so to obtain from the investments in automation and informatics the greatest advantage in terms of competitiveness. Democenter has the mission of helping enterprises throughout the phases of their projects involving technological change.

Democenter promotes its services using the channel of:

- mailing;
- connection with Enterprises Association;
- visits to enterprises associated to Democenter;
- visits to enterprises that Democenter involves in its own research projects;
- University of Modena;
- articles on technical reviews;

The principal clients of Democenter are the SMEs present in Emilia Romagna. Precisely it works with manufacturing enterprises principally acting in the mechanical, electronic-mechanical and electronic field. The reason why enterprises are interested in following our technological demonstrations are both the necessity of new technologies equipment, and the need to be up-to-date not only on machines, but also on complete systems. Many enterprises consider Democenter as a new technology information centre.

Democenter is a service centre for the diffusion of technological innovation, with particular interest for telematics applications, information systems and industrial automation. To this purpose, Democenter acts in strict connection with Enterprise Associations, Universities and Research Institutions, Chambers of Commerce, and Technology Suppliers.

The initiatives of Democenter are grouped into four areas: a) **Demonstration**, b) **Innovation**, c) **Training**, d) **Laboratories**.

Democenter is specifically aimed at enhancing knowledge and skills of small-medium enterprises with respect to:

- automation of machines and productive process;
- introduction and implementation of computer technology for industry;
- experimentation of innovative production and telematic means;
- service and partnership for innovative projects;
- laboratories for unusual applications.

In Democenter are installed up-to-date computer-based systems for automation, planning, and production management. The objective is to offer examples of integrated productive plants (IPID). The present installations include:

- automated machinery and work centre;
- transportation and handling systems;
- CAD, CAE, CAM, CAPP systems;
- software packages for planning, stimulation and production control;
- telematic connections.

Through these installations Democenter promotes a constant communication between technology supplies and the potential users, in the form of **seminars, conferences,** and **meetings.**

Democenter does not buy permanent demonstration equipment. The equipment used during demonstration activities are loaned by the equipment suppliers. The supplier has the possibility of installing his equipment in Democenter with the advantage of:

- using the centre for his own commercial demonstration;
- using the centre for the training of his employees;
- using the centre for the training of his customers.

The pre-industrial production lines/platforms are loaned by different suppliers and change three or four times per years. Democenter has the possibility of maintaining a privileged relationship with equipment suppliers.

Democenter is permanently interested in testing the degree of technology innovation within the manufacturing enterprises of the industrial basin of the region. Throughout this analysis it has been pointed out that SMEs are not up-dated about new technologies offered by the market and about the advantages they can offer.

Democenter organises technical demonstrations in order to:

- diffuse innovative techniques;
- help SMEs to come in contact with equipment suppliers;
- act as a link between enterprises and universities;
- give the possibility to SME to see and test the equipment installed in the centre;
- give the possibility to SME to increase their competitiveness.

Democenter offers technical assistance in the selection of equipment and systems. Democenter acts in conjunction with the enterprise to establish an objective list of selection criteria which is specifically adapted to the case of the particular enterprise. The final choice of the technology/equipment supplier must be an autonomous action of the enterprises.

Session 1: Setting the scene: TDACs in Europe

Dr. Steve Jones, The Welding Institute, United Kingdom

JOINING FORCES : THE UK NATIONAL PROGRAMME FOR TECHNOLOGY TRANSFER IN MATERIALS JOINING.

TWI is an independent Research and technology organisation which specialise in the development and transfer of joining technologies (welding, adhesive bonding, mechanical fastening, etc.) across all industry sectors. With over 2500 Industrial Member companies world-wide, it is an international centre of excellence, which currently employs 400 staff, has 19000m² of laboratory space and capital and site investments of some 55 Mecu. Financial support from the UK Government currently amounts to 13% of turnover, all in the form of contracts.

Although 80% of TWI's UK Industry Members are SMEs, the majority of revenue derives from large companies, or SMEs with sophisticated technology capability or needs. It has been difficult to involve SMEs with lower levels of technical requirements in best practice developments.

The reasons for this are twofold:

- The large, but undeveloped SME market is difficult and expensive to contact and serve. there is always a temptation for the RTO to seek easier and more profitable business in international markets.

- SMEs lack internal resources which are taken for granted in large companies. They need significant help to interpret technical requirements, select and implement solutions, and balance technical, market and commercial needs. This level and type of support is not needed by our traditional customers, and new skills and methods have to be developed for the SME market.

TWI have been participating in a number of ventures which are designed to allow it to widen its services to SMEs. These have included participation in SPRINT, STRIDE and COMETT projects, and a number of UK-specific activities including MPI, Carrier and SUPERNET (the latter project supports the emerging UK Network of Business Links).

In parallel with these activities, TWI, in association with the Department of Trade & Industry and a number of Partner Organisations, has recently launched the *Joining Forces* Programme. This project has a yearly budget of over 4 Mecu and uses a combination of processes to excite SME interest and support their adoption of new manufacturing practices.

The emphasis of the *Joining Forces* Project is not on technical novelty for its own sake, but on the commercial benefits which individual companies may obtain by adopting new materials, processes or product designs. Commercial decisions are supported by information resources, consultations, demonstrations of best practice, product and process reviews and feasibility

studies. Projects results are monitored in relation to the commercial benefits obtained.

Study of RTO/SME interactions is an important element of the analysis which accompanies the project. Observations which may be relevant to this meeting include the following:

- Only a proportion of the available SME population are candidates for effective technology transfer. Selection of candidates for expensive feasibility studies and ongoing support is therefore a priority. Initial selection is best carried out at a local level.

  TWI is working with a variety of local infrastructure organisations, including Business Links and branches of the UK Welding and Joining Society to locate and contact suitable companies. We are also developing criteria which characterises successful growth prospects.

  We estimate that of the 45000 candidate companies available in the UK, less than 8000 will be suitable for technology transfer resulting in commercial growth. The number who will achieve international prominence is much smaller.

- An ability to demonstrate technologies is central to all TWI's technology transfer efforts. The facilities involved are extensive and costly to maintain at an appropriate standard. TWI's operating overhead is correspondingly high.

  Using normal commercial criteria, it is difficult to provide SME contact and support services at acceptable cost without a sources of alternative support income. In the Joining Forces Programme, this is likely to consist of a range of funding sources, including Partner Organisations, Regional Authorities, DTI and EC programmes.

  Our current business plans suggest that a basic support rate of around 40% from DTI and EC sources will be necessary to allow continuing outreach to SMEs. Without such backing, the services will inevitably have to seek revenues available in the market; these will come from providing services to large companies, high technology niche markets, or rapidly developing economies outside Europe.

TWI welcomes the opportunity to participate in this workshop, as we are convinced that networking of best practice is the most effective way of solving the challenges of providing effective services to the SME community.

Session 2: Management Issues

2.1 The Range and Combination of TDACs Services

Dr Günther Scheff, FhG (D)
Mr Jean-Claude Moretti, Conseil Régional de Lorraine

2.2 The Management of Change

Mr Juan Carlos Soriano, AIDO (E)
Mr Alexandre da Silva, GEP Ministry of Industry (P)

Dinner Speech
Technology Demonstration Activities in the USA and Japan

Mr Philip Shapira, Georgia Tech. (USA)

2.3 Sector-versus Technology-Centred Approaches

Mr Gerald Jones, Water Research Centre (UK)
Mr Le Meur, IREPA Laser (F)

Session 2: Management issues

Dr. Günther Scheff, Fraunhofer-Gesellschaft, Germany

The Fraunhofer Gesellschaft has about 25 information and demonstration centres. I want to talk to you about our experience with five centres which are partly financed by funds of our programme for SMEs.

For FhG these centres are a means to acquire R&D orders from industry. That's the most important reason why we installed them.

The most remarkable experience was that there is no portfolio of services ensuring success. There are services which were successful in one centre and a flop in another, sometimes even in a centre about the same topic but in another area of Germany and with different centre managers.

One important service are information seminars and workshops. Their success depends mainly on the general economic situation. During recession the companies had to reduce their costs and they did it among other measures by cutting their budget for staff training. As a consequence during recession several workshops had to be cancelled for lack of bookings. So the economic situation is very important for a centre manager when he decides which services he offers. On the other hand the Centre for Virtual Reality had a big success with a congress on this topic in spring 94 during deep recession.

In this context a few words about the personality and experience of the manager of a centre. To be an authority in science is not enough. He must also be a good organiser and be able to recognise the demand of the SME, he must have a feeling for market.

That's important among other reasons because German companies during recessions often reduce their R&D staff and investments at the first measure. The consequence is that when the economic trend changes they have no new products. In a demonstration centre ideas for new products can be initiated resulting in orders to the respective institute. Therefore the mental orientation of the centre staff towards the market is very important. It's no good to show only the technology you have. Much more important is what you can do with this technology to match the demand of the market.

An average project leader often would be overcharged with the task to manage a centre. So all of the managers of these five centres are at least heads of a department or even chief of an institute. For heads of a department the managing of a centre can be a chance to jump on a higher level of their career. To show them a perspective to get higher in their career can be a good motivation for them.

A controversial matter is the participation on fairs. The opinion on a participation in global or national fairs like Hannover Messe or CEBIT is not so optimistic: the costs are very high, but there are only a few percent of the visitors being interested in this special technological field.

More interesting is to participate in local fairs or fairs for special industrial branches. But even the result of such a fair for a demonstration centre is impossible to calculate. Negotiations on a contract for a R&D project can endure fairly long and beside the first contact on the fair there are so many other contracts that it isn't possible to state that the contact on the fair was decisive for the order. On the other hand one good contact during the Hannover Messe resulting in an order makes it worthwhile to be present. As a consequence of their experiences the centre managers tend to be present more at local fairs in future.

A service which is offered only rarely by our centres because of the big expenditure is organising a congress. In such a case especially when there are a few hundred of participants expected it could be better to let the organization be managed by an external company. Sometimes venture capital for prefinancing can be necessary and this could be too risky for FhG. So for example the 'Virtual Reality World 95' was managed by an external agency and we made good experience with such a handling.

These were several examples of our experience. We think that it isn't possible to offer a service mix which guarantees success. There are too many parameters taking influence, some of them we can't control e.g. the economic situation. There are other reasons why these five centres all are running well.

- The first and most important factor is the way of preparing and selecting a new centre. Every year we get a few proposals for a new centre from our institutes. We consider carefully whether these proposals show the situation on the market and whether they make credible that the respective institutes can increase their turnover with SMEs by the means of this centre. Only if the proposal fulfils these demands as a minimum it will be selected for further consideration.

- The activities of each demonstration centre are attended by a so-called 'Beraterkreis'. That's a circle of 7-10 counsellors not working in a Fraunhofer institute. They mainly come from industry, preferably from SME's, or they are scientists mostly from universities and one or two representatives from trade associations. They have the task to prepare the proposal together with the centre managers, to advise the managers and to initiate contact with companies. The last point not always functions well. This circle is taken very seriously. Normally there is one meeting a year for one day at the centre. At these meetings also the centre managers and representatives of the central administration take part.

- The financial means for the centres are permitted in two phases each during 2-3 years. At the end of the first phase the result is evaluated by the Beraterkreis and members of the central administration. Only if the first phase was successful the financial means of the second are permitted. The decisive parameter are the industrial orders the centre managers could acquire. We also expect the centre managers to adapt the services of the second phase to the demands of the market as shown in the first phase.

- We are thinking how we can improve our marketing e.g. by hiring marketing specialists. At one of our centres this was an important point for the turn regarding their industrial turnover.

These were the three points which I think are more important for success than a special mix of services.

Session 2: Management issues

Mr. Jean-Claude Moretti, Conseil Régional de Lorraine, France

L'EXPÉRIENCE LORRAINE

Préliminaire

L'objet de cette intervention est de présenter, à travers la relation d'une expérience de mise en place d'un centre de démonstration technologique et d'application dans le domaine de la mécanique, la problématique posée aux décideurs régionaux, les différents questionnaires présidant à ces choix et les objectifs et buts visés en matière de développement des technologies dans les PME-PMI.

Pourquoi un tel projet ?

La place des PMI dans le développement économique.

Les PMI jouent un rôle capital dans le développement économique du territoire et la technologie des PMI est un axe majeur de toute stratégie des pouvoirs publics régionaux.

En effet, en terme de compétitivité internationale, les PMI, pour un territoire permettent de faire la différence.

Les grandes entreprises:

- jouent un rôle stratégique pour développer rapidement et massivement de l'emploi
- sont de sources importantes d'innovation
- ont cependant tendance à délocaliser production et activités de Recherche et Développement là où l'environnement est le plus propice.

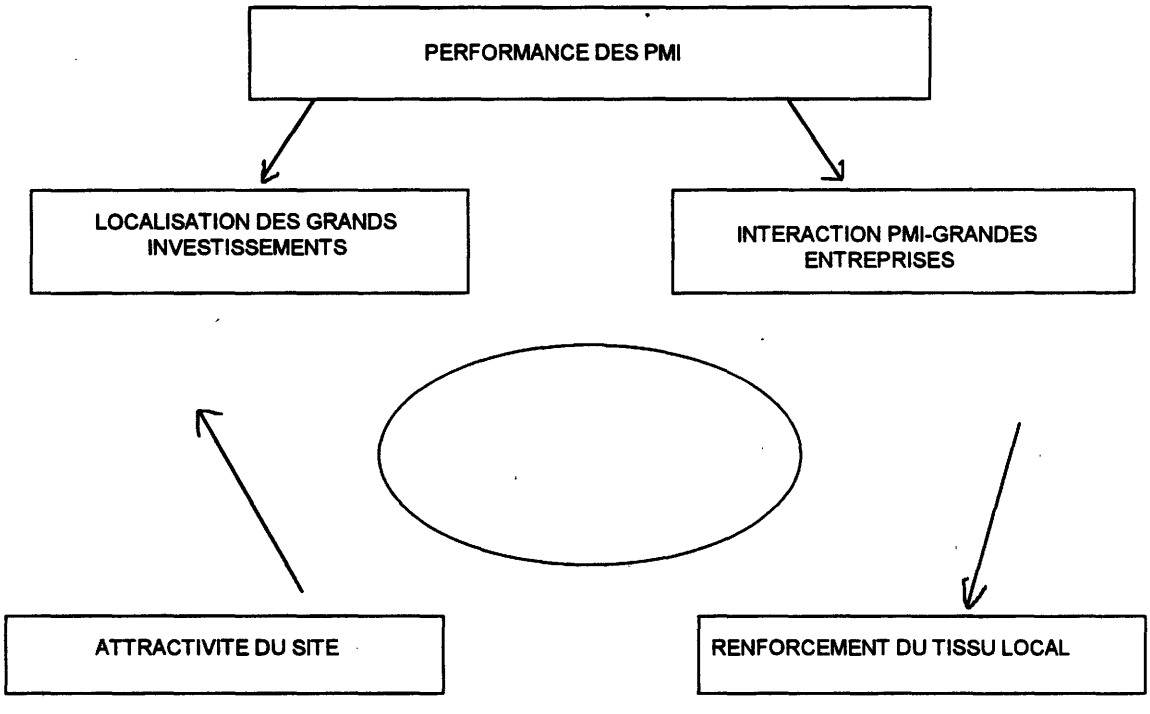
L'environnement des entreprises est constitué de deux catégories de facteurs:

- d'un côté le niveau de qualification de la main d'oeuvre, la qualité des centres de recherche, la stabilité macro-économique, les systèmes de financement, les aides publiques.
- de l'autre des éléments à caractère plus culturels: appréhension à l'internationalisation, le partenariat...

De ces éléments peuvent naître des différences entre régions en créant des écarts:

- de niveau technologique
- de capacité d'exportation
- de stratégie de développement

Il existe un cercle vertueux entre environnement et PMI, grandes entreprises et PMI.



LE CHOIX DU SECTEUR: CONDUIRE UNE ETUDE

Les industries mécaniques en Lorraine

- un constat sur l'emploi
  avec 78000 salariés, 40% des effectifs industriels
  1900 entreprises, c'est le premier secteur lorrain

- une vision des forces et faiblesses de ce secteur

  - une "vocation industrielle" du territoire bien implanté
  - une "culture" de la main d'oeuvre
  - une expérience de coopération transfrontalière
  - une offre technologique importante. Un fort potentiel de recherche

  mais

  - peu de produits propres
  - sous traitance et dépendance
  - champs de clientèle restreint
  - pas de contrôle sur l'évolution des techniques et des marchés

- pas de culture de l'investissement immatériel et réticence à l'appui extérieur

PMI et technologie

- Besoins d'appui extérieurs pour:

  - les objets de haute technologie (achat machine)
  - l'information (évolution des marchés, besoin client, concurrence, veille)
  - l'assistance technique (ex.: contrôle, calcul)
  - les prestations techniques (appropriation technologique)
  - l'élaboration de partenariat

La notion de proximité et de respect de délais apparaissent déterminants

- une demande différente suivant la segmentation

■ SEGMENTATION DE LA DEMANDE POTENTIELLE

Trois segments distincts:
- les petites structures indépendantes (< 50 personnes)
- les structures indépendantes de moyenne taille (≥ 50 personnes)
- les filiales ou établissements de groupes

SEGMENT 1: PETITES STRUCTURES INDEPENDANTES (< 50 P.)

- **Profil:**
  - Fortement dépendantes des grands donneurs d'ordres présents en région (plus de 50% du CA dans la sidérurgie ou les houillères).
  - Fabricants de pièces élémentaires ou de sous-ensembles sur plan et en petite série (voire à l'unité)
  - Détentrices d'un savoir-faire sérieux, mais largement perfectible (délais, coûts, qualité...)
  - Animées par un "homme orchestre" à la fois chef de production, responsable qualité, responsable commercial...

- **Recours à des compétences externes: faible**

- **Réceptivité globale au concept MECANICA:**
  Faible (doutent de la capacité de MECANICA à les aider à "se sortir" d'une situation actuellement difficile - baisse du plan de charge, incertitude quant à l'avenir des donneurs d'ordres).

SEGMENT 2 : STRUCTURES INDEPENDANTES DE TAILLE MOYENNE (≥ 50 P.)

- **Profil**
  - Secteurs de débouchés diversifiés
  - Fabricants de pièces élémentaires ou de sous-ensembles techniques (usinage de précision, chaudronnerie et tôlerie fine...), voire de produits finis (machines spéciales, pompes, sondes...)
  - Détentrices de savoir-faire pointus et évolutifs (facteur de différenciation, culture technologique)

- Structurées et souples à la fois, détentrices d'un bon potentiel de développement.

- **Recours à des compétences externes: moyenne à forte** (Institut de Soudure, CETIM, SOCOTEC, autres centres techniques tels que CTDEC...)

- **Réceptivité globale au concept MECANICA:**
  forte (voient en MECANICA un vrai partenaire de **proximité**).

SEGMENT 3 : FILIALES DE GROUPES

- **Profil:**
  - Structures de moyenne à grande taille (à quelques rares exceptions près).
  - Fabricants de sous-ensembles très techniques:
    en grande série pour l'automobile
    en petite série pour l'aéronautique et l'armement
  - Détentrices de savoir-faire pointus en usinage, fonderie, assemblage...

- **Recours à des compétences externes: faibles (recours groupe)**

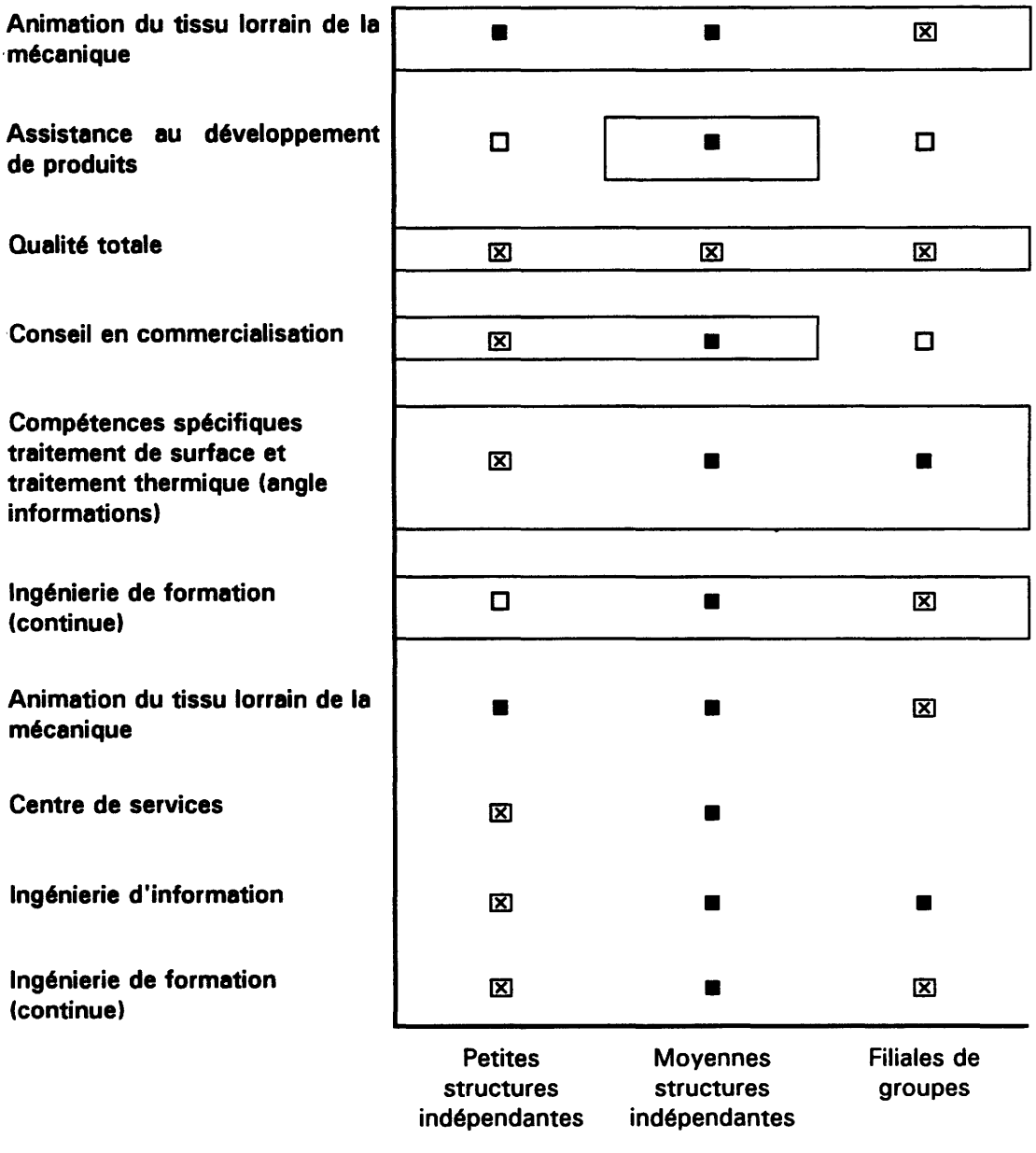
- **Réceptivité globale au concept MECANICA:**
  DUALE (faible en tant qu'utilisateurs potentiels, forte en tant qu'acteurs soucieux de la pérennité du tissu économique régional).

■ LES ATTENTES DES ENTREPRISES : SYNTHESE

THEME D'ACTION	CONTENU	STRUCTURES INDEPENDANTES		FILIALES DE GROUPES
		<50p.	≥50p.	
ANIMATION DU TISSU LORRAIN DE LA MECANIQUE	Sensibilisation aux évolutions des métiers	☒	■	☒
	Promotion des collaborations interentreprises	☐	■	☒
	Ecoute permanente des besoins (panel d'entreprises)	■	■	■
	Valorisation des savoir-faire régionaux	■	■	☒
CENTRE DE SERVICES	**Assistance au développement de produits propres**	☐	■	☐
	• Fonction bureau d'étude	☐	■	☐
	• Prototypage rapide	☐	■	☐
	• Aide à l'industrialisation	☐	☒	☐
	Qualité totale	☒	☒	☒
	• Conseil certification ISO	☐	☐	☐
	• Fiabilité / maintenance	■	■	☒
	• Maîtrise et gestion de l'environnement	☐	☒	☒
	Conseil en commercialisation	☒	■	☐
	Axe spécifique matériaux	☐	☒	☒
	• Observatoire des matériaux nouveaux	☐	☐	☒
	• Métallurgie des poudres	☒	■	■
	• Traitement de surface	☒	■	■
	• Traitement thermique			
INGENIERIE DE FORMATION	**Formation initiale**	☐	☐	☐
	Formation continue	☒	■	☒
	Domaines:			
	• Techniques de mise en oeuvre	☒	■	☒
	• Connaissance des matériaux	☐	☒	☒
	• Informatique industrielle	☐	■	☐
	• Méthode	☐	☒	☐
	• Qualité	☒	☒	☐
	• Sécurité	☐	☒	☒
	• Environnement	☐	☐	☒

☐ Faibles ☒ Modérées ■ Fortes

■ LES ATTENTES DES ENTREPRISES



Une analyse de l'environnement

Cette analyse de la demande doit être croisée avec une analyse de l'offre et de l'environnement.

- activité
- localisation

La plate-forme technologique

Trois axes

1. Agir sur la culture: susciter l'appétence technologique

    - sensibilisation
    - promotion
    - démonstration
    - animation - réseau de partenariat

2. Structurer la demande

    - prospection
    - audit
    - analyse

3. Prestations de service/nouvelles technologies

    - études
    - essais
    - calculs
    - caractérisation des produits
    - prix-marché
    - formation

Le financement du dispositif

Perte annuelle d'exploitation liée à la vocation d'animation de la filière:

- actions à caractère collectif

- structuration de la demande

OBJECTIFS	ACTIONS	OUTILS
Agir sur la culture - de l'entreprise - de son environnement	 - susciter la demande en informant - susciter la demande en dynamisant les contacts entre les partenaires socio-économiques - revaloriser l'image de la mécanique	 - Centre de service documentation - conférence - démonstration - point-rencontre - conférence - démonstration
Structurer la demande	- informer sur les orientations possibles - Eclairer l'entreprise (évolution des techniques, produits, marchés...) - Former les décideurs	- Centre de service documentation conseil, ... - Conférence - Démonstration - ingénierie de formation
Centre de service	- Informer sur les solutions, accompagner l'entreprises dans ses choix, assurer l'interface	- Centre de service: prestation...
Centre de proximité	- Répondre aux besoins conventionnels des entreprises	- Centre de service proche de l'entreprise

Session 2: Management issues

Mr. Juan Carlos Soriano, AIDO Industrial Optical Association, Spain

AIDO, Industrial Optical Association, was established in 1988 jointly by Small and Medium Enterprises and the Regional Government, Generalitat Valenciana.

The status is the corresponding to a private non-profit research association. AIDO is located in Paterna Technological Park, and is one of the Technological Institutes IMPIVA's network.

The evolution of ratio in funding sources shows an increasing participation of enterprises supporting the annual budget. The companies associated to AIDO come from different sectors of activity (printing arts, paints, ophthalmic optics,...) that implies a polisectorial character.

The aim of AIDO is to generate innovation -, by cooperative applied research and the technological development of the industries, through the use of the new optical technologies, in order to increase product quality, improve competitiveness and make industrial progress.

Demonstration

Basically, demonstration is a **process** beginning with the feasibility studies (technological or economical) made in technical departments: laser; Image Processing and Color, and ended in cooperative applied research including training and information activities.

Companies come to AIDO looking for solutions for the industrial and/or management problems. Optical technologies provide an easy analysis of causes in products and process problems. Solutions across the sectors to the same problem is furnished by a Technical centre if this is working in **generic** fields, as Optics.

AIDO detect common industrial problems in many sectors and offer new optical technologies as solutions. The concept of **new technology**, as Optics, implies that the solution is made, and just need to indicate the moment to start (**When?**) to apply it. On the contrary **traditional technology** needs to search as the solution (**Which?**) as the process (**Who? What? and Where?**), because must be identified clearly the problem. The time to resolution is the advantage for **new technology**.

On the other hand demonstration process is carried out by technical contacts, based in mutual confidence between the Company and the Centre, so it is absolutely necessary to maintain confidentiality, and to adapt the technical solution to enterprise reality. In many cases the demonstration process show management deficiencies, and the Centre must be reply in this way.

Cooperation

The cooperation between small and medium sized industries is the inexpensive way to access to technology demonstration, and to obtain permanent information about state-of-the-art of technology for specific sector. The cooperation can be developed inside one Association, or by means of international contacts promoted by the Association.

The cooperative applied research is another way to do demonstration process. The companies involved in cooperative research obtains benefits, not only in economical sense but in knowledge of markets and tendencies, derived from the results of the investigation.

Session 2: Management issues

Mr. Alexandre da Silva, GEP Ministry of Industry, Portugal

DEMONSTRATION ACTIVITIES IN PORTUGAL

In the framework of the technological demonstration activities two main instruments are available in Portugal: the operation of Demonstration Centres and Firm to Firm demonstrations.

Since the mid 1980's a network of non public technological infrastructures (IT) has started to be built aiming to contribute for the modernisation of industrial companies, namely SME's, a development which was only possible with the support of PEDIP.

These IT can be fitted in three main categories: Technology Transfer Centres, Technological Institutes and Demonstration Centres.

Nevertheless all these Demonstration Centres are not run by separate entities but they are organised as departments of the Technology Transfer Centres or Institutes.

Twenty four Demonstration Centres have been supported by PEDIP in 12 different IT. Mostly they are oriented towards the demonstration of mature technologies, sector oriented and mainly dealing with manufacturing technologies.

Their mission is to make industry aware of technology, its demonstration and to assist firms during the implementation phase.

The total investment in equipment made by PEDIP was in the range of 25 million ECU, representing 15% of the total budget assigned to IT.

Running costs are not directly paid. Support funding from Ministry of Industry (MIE) is given directly to SMEs who, in turn, contract services from Demonstration Centres.

Additionally, MIE could contract any Demonstration Centre to carry out demonstration trials for a pre-set number of companies, when the industrialists are not yet motivated for such experience, and share the costs with them.

The services provided by these Demonstration Centres include: information about technology-advantages, costs and qualifications required, demonstration of applicability, results obtained in operational conditions and their reliability, assessment of economical and operational feasibility, advice on selection of equipment, support in the process of technology transfer, training, and diffusion of cases of success.

Another tool to break the resistance to motion towards new technologies are Firm to Firm Demonstrations.

Here, imitation is used as a starter of the innovation process where the main actor on the stage are firms which are encouraged to share their experience related with organisation or use of new technologies with other potential users, even their competitors. The are called Acções de Demonstração.

During last 3 years PEDIP assigned to these activities 55 million ECU from its overall budget to support 170 of these actions.

Subjects or sectorial areas for Acções de Demonstração are set yearly for reception of proposals claiming for financial incentives.

Summary of 1st day

Mr. R. Miège, European Commission, DG XIII/D/4, Luxembourg

I would like to thank everyone for being with us today. It has been an enriching experience. Our discussions are becoming ever more intense. I will not attempt to summarise all that has been said. However, there are a few points which I think are particularly outstanding and on which I would like to comment.

First of all there is the issue of demonstration. The title of our seminar refers to demonstration centres but it is more the demonstration as a function which we are considering not necessarily a centre or any specific type of organisation. It is the function that is of importance.

Demonstration activities are often established within some sort of host body which enables the TDAC to offer more than just a demonstration function. This, of course, leads us to the incorporated technology side of things. Many demonstration centres are often involved in the transfer of tacit knowledge, an important point.

We have heard of a number of policy measures too, aimed at encouraging demonstration activities and we shall be hearing more about these issues tomorrow. The positive features of TDACs and what struck me in fact in some of the presentations we've heard today are some of the following:

- Demonstration centres - when they are successful - can reach very small customers who may not be reached by any other approach.
- As Mr. Walsh was saying this morning - a centre implies some sort of a guarantee for small firms. It can reduce the potential risk they are facing when implementing a new technology.
- Demonstrations are not tied to a particular supplier. Independence and neutrality are important i.e. non-commercial advice.
- Another characteristic of centres worth mentioning is that its demonstration activities are not a once only action. Instead it is an ongoing process, an accompanying of firms in the innovation process. All of our studies show that it is this accompanying role that can be particularly helpful. Information, technical support, that is all very well but it is the additional help along the road or a bit of follow-up that is particularly well received.

Another point that was mentioned a number of times is that demonstration as such is not enough. It has to come in a package including advice, training, technological monitoring, support in quality efforts, and so on.

Moving on to instruments, political measures, policy measures, they have been touched upon by a number of people. The one thing that struck me is the tremendous variety of instruments available. There is a certain commonality with regards to concerns. A number of people from ministries have indicated that there is a desire to show what technology is capable of, a common desire to support the spread of technology, the need to assess demand or to assess gaps in the system. This is perhaps what we could look at a little bit more tomorrow.

Coming back to what Mr. Walsh was saying this morning. Managing a centre he needs a certain time horizon (i.e. perspective). If this horizon is just one or two years ahead and he has no financial security for the future, how can he keep his staff? How can he possibly plan for the longer term future? Thus, a certain distance regarding the time horizon is needed.

Concerning measures linked to performance we have heard about the Fraunhofer Society. Competence centres were created with one aim being the possibility of encouraging contracts with industry. Mr. da Silva has shown another way of supporting the demand side by encouraging industry to resort to centres. Thus, there are various approaches and we will possibly be hearing about even more of them tomorrow. Another subject are assessment methods. How do you assess or evaluate impact and cost effectiveness of centres.

Dinner Speech

Prof. Philip Shapira, School of Public Policy, Georgia Institute of Technology, USA

Technology Demonstration Activities in the United States and Japan

Summary of Presentation

Although the United States and Japan differ in many aspects of industrial and technology policy, in recent years they have focused increased attention to the modernisation and technological upgrading of small and mid-sized manufacturing enterprises (SMEs). In the U.S., there has been much concern about the slowness of America's 360.000 SMEs in adopting new manufacturing technologies and techniques. Equally, Japan's more than 700.000 small manufacturing firms - hit by the post-1991 collapse of the "bubble-economy" and the rising value of he yen - are increasingly seeking to develop their own technological capabilities through horizontal mechanisms, to supplement traditional and now changing vertical ties with larger corporations. In response to these developments, enhanced policies for national and regional level technology promotion, demonstration, and application have been introduced in both the U.S. and Japan. These policies - focused mainly towards small and mid-sized enterprises - aim to supplement and strengthen each country's existing private and public primary channels for technology assistance and diffusion.

In the United States, three general types of publicly-sponsored technology demonstration efforts can be identified. First, throughout the post-World War II period, there has been a significant level of support for the prototyping and demonstration of fundamental innovations and new technologies derived from basic research and development. The federal government has been a primary funder of this "supply-driven" approach, through mission-driven agencies in such areas as defence, space, energy, agriculture, and health and through the support of fundamental science. In recent years, this "technology pipeline" and "technology spin-off" model has been reviewed on grounds of cost-effectiveness, timeliness, and linkage to commercialisation. This has led to new initiatives to improve collaboration between federal research and industry and promote the development and demonstration of dual-use technologies (with the latter seeking the simultaneous - rather than linear - combination of mission-specific and commercial technologies).

A second type of public technology demonstration involves the demonstration of new process technologies, including equipment and software. Again, there has been an important defence sector role, with defence services and logistics agencies supporting manufacturing technology programs to assist defence suppliers in using new or specialised production technologies. Among civilian agencies of the federal government, the National Institute of Standards and Technology (NIST) has operated an Advanced Manufacturing Research facility to develop and demonstrate new integrated manufacturing technology and software, as well as a NIST "Shop

of the '90s" focused to smaller-firms interested in up-to-date but lower cost technologies. Support has also been given to consortia of companies in specific industrial sectors to develop, test, and disseminate new technologies. Simultaneously, at the state and local level, there has been a considerable growth of centers whose activities include the demonstration of new process technologies. Additionally, more than two-dozen shared manufacturing facilities (also known as teaching factories) have been established where machinery, computers and software are made available for demonstration, company evaluation, and training. Another major development is the expansion of manufacturing technology and extension centers and programs sponsored by states and localities with matching federal funds (through NIST's Manufacturing Extension Partnership program) as well as industry support, with further expansion planned. These centers provide a variety of services to assist companies upgrade technology and manufacturing. Several offer associated demonstration facilities to exhibit equipment and software and provide opportunities for testing and training.

The third area of publicly-supported technology demonstration is the promotion of improved "soft" practices in manufacturing, management, and training. At the national level, the federal government sponsors (through NIST) the Malcom Baldrige National Quality Award. This aims to encourage firms to improve quality. While a national contest annually highlights exemplary companies, more subtle impacts have been identified through the dissemination (more than a million copies to date) of the award's guidelines and the use of these guidelines by many firms to upgrade quality, employee involvement, and customer satisfaction. Another national example is the US Department of Labor's pilot demonstration project to promote "high-performance" work environments. Federal funds have been provided to groups of firms and local institutions to help them demonstrate improved ways of organising work and improving productivity. State and local manufacturing technology and extension centers, colleges, and other programs in many locations are also sponsoring various continuous improvement groups, learning networks, and industry consortia to deploy best manufacturing and workforce practices.

Proposed Congressional reductions in federal expenditures for technology demonstration and application programs may slow the growth of US efforts over the next few years. However, it is likely that state and industry support (coupled with remaining federal funds) will support the continuation of many existing programs and the ongoing development of new experimental initiatives.

In Japan, public policies have consistently sought to promote industrial and technological development; several systems of infrastructural support have been established to demonstrate and deploy technology. These systems are now being restructured and updated, with a greater emphasis on advanced technology promotion, new product development, information exchange, and technology venture business support. A cornerstone of the Japanese system, particularly for small and mid-sized firms, is the network of more than 170 local public technology and testing centers (Kohsetsushi). These centers provide technological assistance and conduct research aimed at assisting small and medium enterprises (SMEs). Technology demonstration is one of the program's core services. Most Kohsetsushi maintain facilities where new manufacturing equipment and computer facilities are available to

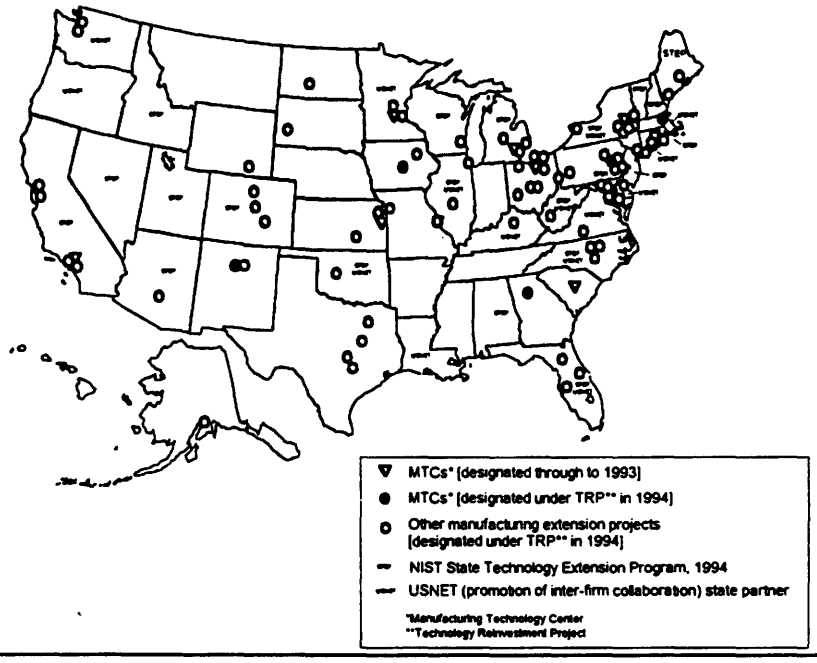
SMEs for evaluation, training, and trial production. Kohsetsushi centers supplement these facilities with seminars, cooperative research projects, industrial exhibitions, and individual technical assistance to area companies. The Kohsetsushi centers are administered and largely funded by prefectural and local governments under the guidance of the Ministry of International Trade and Industry.

While the Kohsetsushi centers still have an important role, increased interest in new forms of technological development and in addressing regional problems of industrial restructuring and the distribution of technology-intensive firms in Japan have led to the emergence of additional programs and centers. New public and "third-sector" (public-private) technology centers have been established in Japan to promote software development, new materials, biotechnology, and other emerging technologies. Often these new "technocenters" are associated with older Kohsetsushi centers and most have a technology demonstration element. However, while massive investments have been made in such new technological complexes, the effectiveness of these initiatives remains to be fully demonstrated.

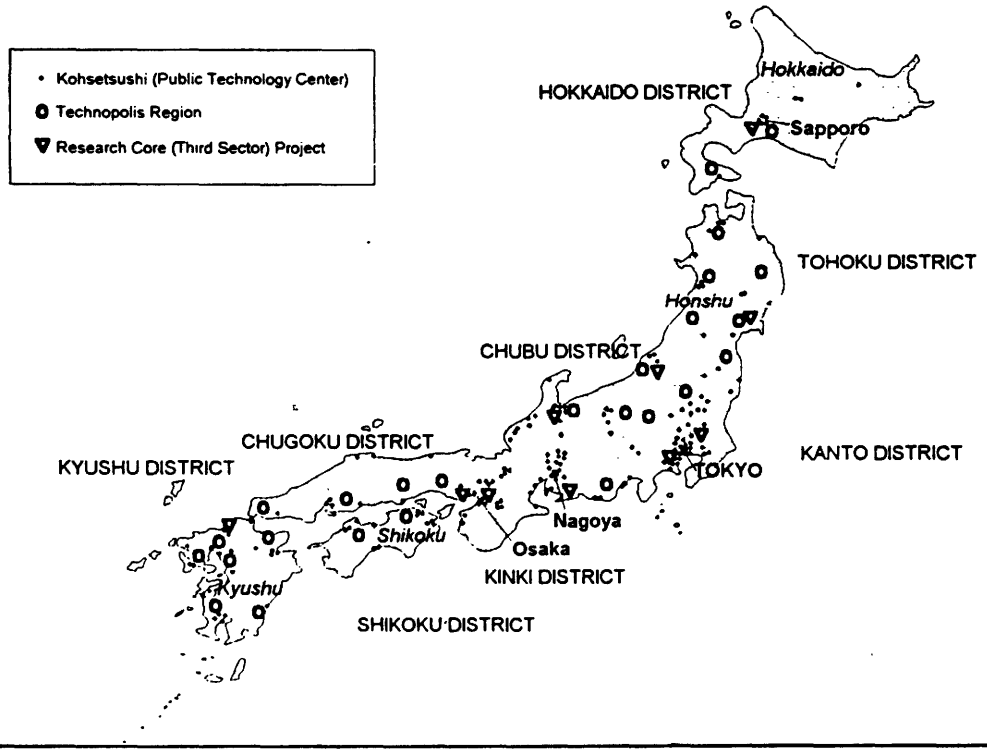
Local governments in Japan also sponsor trade centers and local small enterprise assistance centers. These centers may provide facilities for equipment testing and prototyping and organise trade exhibitions where new products and process technologies can be viewed. There are also many local industrial organisations and associations which often receive some prefectural and local government support. These organisations performed critical roles in the demonstration and diffusion of technology in the early modernisation of Japan and they continue to serve as part of the social fabric for the exchange of information about new technology and the sponsorship of new technology projects and study groups. Over the last few decades, local associations have worked with governmental agencies to cluster related industries together with the aim of promoting and sharing modern facilities. Additionally, a growing number of technology exchange and technology fusion groups have been formed (more than 2,500 by 1994) through which local firms consider new technologies and try to develop diversified new products and processes. Kohsetsushi and other technology centers are frequently involved in assisting these groups and in making their facilities and expertise available.

Although Japan's public technology infrastructure is comprehensive, private sector interactions with customers and vendors and firms' own efforts remain most critical in the transfer and deployment of new technology. However, the public technology infrastructure does provide useful (and sometimes much used) services and it forms an important part of the social infrastructure for technology development in Japan. In general, public technology centers and programs are relatively more important for small firms than large ones. The good facilities of these centers, the specialised training available, and the low cost of using services and facilities are principal attractions for SMEs. As the United States, Japanese SMEs mainly look to local technology support agencies for assistance in improving current technologies and existing products. While the new technocenters hope to upgrade the public sector's role in new technology product development, to date this goal has yet to be fully realised.

Map I. Technological Modernization and Industrial Extension
Recent Federal-State Projects in the United States



Map II. Kohsetsushi Centers and Regional Technology Projects in Japan



SECOND DAY

Session 2: Management issues

Dr. Gerald Jones, WRc plc, United Kingdom

Views and experience from WRc, a company involved with sectorially oriented TDAC activity.

1. Overview of WRc plc.

WRc plc is an independent, staff-owned company working in the market sector of water supply, pollution control and environmental management The company employs 450 staff and has an annual turnover of 32 million ECU.

The company has a strong base of expertise based on applied R&D and undertakes complementary implementation activities with its customers. In addition, a range of specialist services are offered to customers. TDAC activity is undertaken as an integral part of implementation activities in the context of specific needs and initiatives.

WRc's activities are international with a focus on European activities. This has developed progressively from strong customer and skill bases in the UK. WRc works with three broad customer groupings: water utilities (public and private), industry and regulatory (National, European and International). The skill based technical groups encompass a wide variety of areas relevant to the market sector. There are currently 25 skill based groups including Environmental Toxicology, Sensors and Instruments, Pipeline Technology and Wastewater Treatment. To complement its in-house expertise, WRc has developed links, with encouragement from Government and customers, with a number of universities and other organisations. Working on a centre of excellence basis, their skills are available 'on tap' and range from materials analysis to biotechnology and finite element analysis to business efficiency and appraisal.

Because WRc's activities cover all aspects of the water-cycle, it is able to produce integrated solutions which take into account the effects on related activities of the specific activity being investigated. Through its portfolio of activity, WRc is involved at the interface of 'Technology Push' and 'Customer Pull'.

2. Practical Case Studies.

2.1 Plastic Pipes for Water Supply

The objectives of the demonstration and application activity were to:

- ensure a smooth technical introduction of blue medium density polyethylene (MDPE) to the UK marketplace on a volume basis.

- disseminate objective technical understanding relating to PVC-U pipe.

- address known end-user concerns.

The key success factors identified in the context of the project were:

- a set of defined end-user concerns and problems, both technical and economic.

- new technology developments for plastic pipeline systems.

- involvement of raw materials suppliers and pipe manufacturers.

- independent and objective research capability.

- product assessment in real end-user environment.

- Institutional part-funding.

2.2 Real Time Control of Urban Drainage and Sewerage Systems (SPRINT SP226)

The broad objectives of the project are to establish activity at a pilot level to examine and assess the benefits of introducing a Real Time Control (RTC) environment to sewerage systems. The project is current with 18 partners from 10 European countries. This represents the first full integration of relevant technologies in real operating environments.

The key success factors currently identified in the context of this project are:

- Pilot projects with local objectives and specific challenges in various EU cities.

- Extensive use of specialised instrumentation hardware and software for the establishment of RTC.

- Widespread dissemination of results and experience.

- Part institutional funding from EU.

3. Future Opportunity Areas for TDAC Activity.

3.1 Wastewater Treatment

In this area a harmonised regulatory framework is developing in the context of fragmented approaches to technology specification and design. Currently, the formal frameworks for the assessment and take-up of new technologies in wastewater treatment at an EU level are poor. There are opportunities to develop packaged/modular treatment plant and greater standardisation.

3.2 Water Recycling/Re-use.

There is a developing market need due to the increasing cost of water and local/regional water sources constraints. There is significant active technical development in the area. However, the industrial end-user community is fragmented and there is no formal infrastructure for the independent assessment and demonstration of new/developing technologies.

4. General Observations / Conclusions.

From WRc's experience in demonstration and application activities, specific initiatives achieve more than dealing in generalities. The decision to invest in and support fixed demonstration activities at a TDAC is important but difficult. Key factors to be considered include life, market/technology dynamics, utilisation of human resources and support infrastructure and the benefits of financial gearing to users of the fixed resource.

In assessing the relevance of field based demonstration facilities factors such as life and financial gearing are again important. In addition the appropriateness of the technology area, project management and the communication/dissemination of information require particular attention.

It is seen that sectorial and technology centred approaches mutually complement each other. The approaches and roles are not 'black' and 'white' and should be reviewed objectively in the context of specific initiatives.

Session 2: Management Issues

Mr. Le Meur, IREPA Laser, France

IREPA LASER
TECHNOLOGY CENTRE

CREATION	January 1983
SUPPORT	Regional Council of Alsace Research and Technology Ministry (Equipment + technological advisers)
INVESTMENT	25 MF
STAFF	◆ 15 engineers and upgraded technicians ◆ Secretaries ◆ Ph-D students ◆ Associated research teams (ENSAIS, ENSPS)
MISSION	Preparing and following the development of laser applications in the industry by: ◆ Promotion and awareness actions in the field of laser technology, ◆ Technical assistance and consultancy, ◆ Technico-economical feasibility studies ◆ Continuous training to engineers and technicians, ◆ Development of applications and technologies associated to laser under R&D contracts.
MEANS	10 laser systems: CO_2, YAG,Excimer...
APPLICATION FIELDS	- Cutting - Welding - Drilling - Marking - Engraving - Hardening - Laser assisted machining - Alloying - Cladding - Remelting - Cleaning - Surface preparation - Micro-machining
GOALS OF THE TECHNOLOGY DEMONSTRATION	Bringing the companies the technology necessary to strengthen their competitiveness ↗ Competitiveness: ↘ Delivery times ↗ Quality ↘ Cost ↗ Flexibility

MAJOR DIFFICULTIES OF IREPA LASER

- ☐ No captive client because technology oriented centre
- ☐ Priority target: SMEs / SMIs

  Problems:

  → Knowing how to evaluate the profitability of a new technology,

  → Appropriating the technology in the optimal way because of:

  - ➢ low number of executives
  - ➢ lack of time to be informed
  - ➢ incomplete technical competencies,
  - ➢ rapid evolution of the technology.

- ☐ Staying technologically up-to-date

  = > high investment cost

- ☐ Different steps of the laser technology demonstration:

The "laser" concept comes out inside or outside the company

Technical feasibility

Technico-economical validation

Prototype

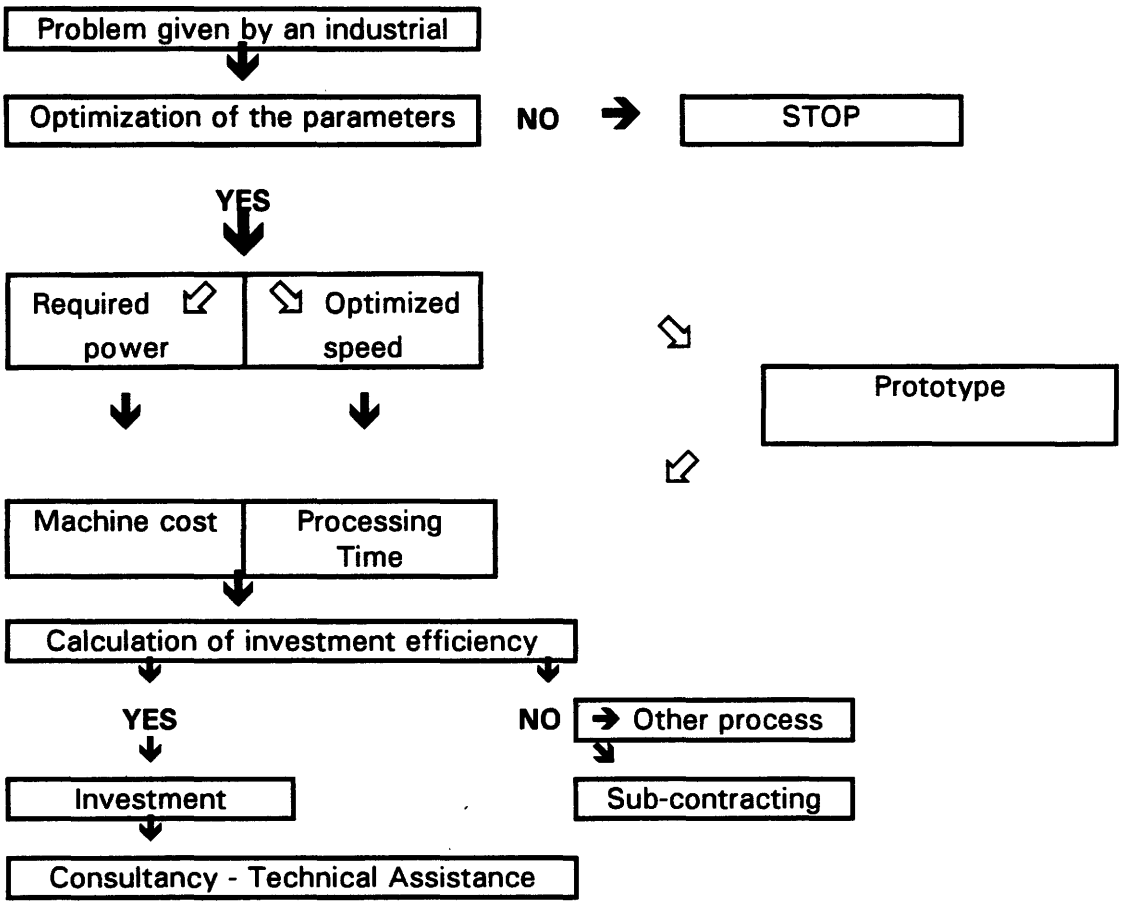
Pre-serie

Phase of investment:
- ➢ definition of the specifications
- ➢ choice of the supplier
- ➢ preparation of the machine set-up
- ➢ qualification of the process
- ➢ reception of the machine

Putting into production: acquisition of the technology - integration in the different departments of the company.

Production

Centre steadfastly oriented towards global assistance in management



Session 3: Technology Demonstration in Enterprises

3.1 Examples, Justification and Perspectives of Company Visiting Schemes.

Transferring Management Best Practice:
Inside UK Enterprise
J. Launchbury, DTI (UK)

Exchange of Experience Between Companies:
The German TOP Programme
Dr Christian Brebeck, BMWI (D)

Innovative Co-operation at the regional Level:
The TOP Programme of ADEGI in Spain
José Maria Ruiz Urchegui, ADEGI (E)

Presentation of the French Scheme, "Reference"
Charles-Etienne Thomas, ADEPA (F)

Current Achievements: Case Studies and Results
Michael Vowinckel, IMK (D)

Proposed Developments and perspectives
Dr Christian Brebeck, BMWI (D)

Session 3: Technology Demonstration in Enterprises

Mr. J. Launchbury, DTI, United Kingdom

INSIDE UK ENTERPRISE - A BUSINESS TO BUSINESS INFORMATION EXCHANGE

The UK Department of Trade and Industry has used a wide variety of technology transfer mechanisms since 1980 to encourage the adoption of new technology. None have been more effective than the business to business exchange of information undertaken at host company sites.

Companies in receipt of government grants to assist the implementation of new technologies were obliged to demonstrate their operation and share their experiences with others. In effect these companies became Technology Demonstration Centres and a nation-wide network of host sites was established.

By the end of the 1980's, DTI and business realised that technology alone was not the answer to improved competitive performance. The management of technology was also a key factor in achieving the most effective results from technology. Furthermore, the management implications of technology cascade throughout the whole organisation and not just in those areas where it is employed; To exploit technology to its fullest, an organisation must be able to accept change and adapt to new methods of working, employees must be multi-skilled in many cases and work in teams. All functions of the business organisation must work together to ensure that all processes from design concept to finished product or service are in harmony.

These are all issues that must be addressed by management and are features of the re-focused Inside UK Enterprise programme. Inside UK Enterprise is not just a company visit programme, it is a true business to business information exchange. Small groups of participants are assembled and visit the host company sites to share in a structured exchange of information. The emphasis is on practical demonstration of the best practice theory under discussion.

Inside UK Enterprise is a simple concept but has proved to be very effective. The scheme is designed for easy and rapid access to sources of relevant best practice knowledge and the transfer ration is high. Evaluation has consistently shown it to be the highest motivational activity for encouraging significant change in management practices.

The scheme relies on the goodwill of the hosts and their willingness to share ideas and experience with others. The visiting participants, in general, will not have had any previous contact with the host prior to the information exchange -and there is only a small chance that they will develop a commercial relationship as a result.

The hosts commit their time and energy to help others because Inside UK Enterprise is a government sponsored initiative and there is some recognition

of the companies' worth in being one of the 120 reference sites for management best practice. Of more practical benefit, however, is the value of the information exchange. Host companies always learn something valuable from the visitors. Large companies learn from small, small from large and companies exchange knowledge across business sectors.

The identification of best practice is of critical importance to the success of Inside UK Enterprise and DTI use various benchmarking and assessment models to evaluate the host company performance prior to them joining the scheme. The information exchanges are promoted to senior and middle managers in UK business and anyone in this category is eligible to attend. The average exchange comprises 10 managers from a variety of companies. 60% of participants are from SME's.

To further assist Small companies DTI have developed a local entry point for information exchanges with a regional version of Inside UK Enterprise. The 11 local schemes operate in the same way as the national activity but cater for the specific needs of the small companies in the local area. Managers soon realise the benefit of the exchanges and migrate to the national scheme for the wider view.

From the UK experience, we believes that such schemes could be implemented easily in other countries and that these independent activities could be networked on a multi-national basis to widen the scope of information exchanges. For this reason DTI has shared its knowledge to assist the development of similar schemes in Germany and Spain.

Session 3: Technology Demonstration in Enterprises

Dr. Christian Brebeck ,Bundesministerium für Wirtschaft, Deutschland

BUSINESS TO BUSINESS INFORMATION EXCHANGE

A PRACTICAL APPROACH TO TECHNOLOGY TRANSFER.

The German TOP Programme

Das Technologieorientierte Informations- und Besuchsprogramm TOP in Deutschland hat sein Vorbild in dem Programm "Inside UK Enterprise". Wir haben das Programm auf einer Sitzung der Europäischen Kommission kennengelernt und als Modellversuch zur Förderung des Technologietransfers übernommen. Das Bundesministerium für Wirtschaft unternimmt eine Reihe solcher Modellversuche, um innovative Strukturen zur Umsetzung neuer Technologien zu entwickeln und so die Leistungsfähigkeit der Wirtschaft zu stärken.

Eine besondere Zielgruppe sind kleine und mittlere Unternehmen, die in hohen Maße auf externen Rat und überbetriebliche Lösungen angewiesen sind. Ein intensiver und vielfältiger Technologietransfer soll auch dazu beitragen, daß Unternehmen in Ostdeutschland die Auswirkungen des alten Planungssystems überwinden und ein am Markt orientiertes Produkt-, Verfahrens- und Organi-sationswissen erwerben.

Mit TOP wird der Austausch praktischen, breitbandigen Erfahrungswissens zwischen technologisch führenden Unternehmen und anderen innovationsfreudigen Unternehmen angeregt. Dieser Erfahrungsaustausch erfolgt zwischen Fach- und Führungskräften auf eintägigen Veranstaltungen im gastgebenden Unternehmen. Auf den Veranstaltung, die auf ein bestimmtes Thema bezogen sind, stellt das gastgebende Unternehmen neue Technologien und innovative Unternehmensstrategien in seinem Betrieb vor.

Die Veranstaltungen beinhalten oft Themen nicht-kodifizierten, sensiblen Wissens, das die Gastgeber auf der Grundlage gegenseitigen Vertrauens mit Vertretern anderer Unternehmen teilen. Deshalb hat jeder Gastgeber das Recht, Besucher ohne Angabe von Gründen abzulehnen. Der Teilnehmerkreis ist auf Vertreter von Unternehmen beschränkt; Unternehmensberater, Lehrkräfte, Vertreter der Öffentlichkeit usw. nehmen nicht teil.

TOP hat sich nach kurzer Einführungszeit gut und erfolgreich als neues Medium des Technologie- und Erfahrungsaustauschs entwickelt. Es bereichert in idealer Weise das vorhandene, vielfältige Innovationssystem. Es spielt eine positive Rolle bei der Eingliederung ostdeutscher Unternehmen in das deutsche Wirtschaftssystem.

Das TOP-Angebot bot schon im Gründungsjahr 1992 mit 105 Veranstaltungen bei 25 gastgebenden deutschen Unternehmen einen guten Querschnitt von insbesondere für mittelständische Unternehmen wichtigen Technologien und Strategien. 1993 konnte das Angebot auf 209

Veranstaltungen bei 42 Gastgebern ausgeweitet werden. 1995 bietet TOP bei rund 50 Gastgebern etwa 180 Veranstaltungen an. Neue, namhafte Gastgeber mit interessanten Programm-angeboten konnten für TOP gewonnen werden. Bis heute haben weit über 5.000 Führungskräfte an TOP-Veranstaltungen teilgenommen.

Jetzt geht das Interesse über Technologiethemen hinaus auch zu strategischen Themen, die Unternehmsstrukturen angesichts neuer technologischer Entwicklungen betreffen. Veranstaltungen über Gruppenarbeit, über Arbeitsstrukturen und Unternehmens-strategien wurden besonders stark nachgefragt, während klassische Angebote über die Anwendung neuer Fertigungstechnologien eher in den Hintergrund traten.

Die Struktur der Teilnehmer hängt von dem gewählten Thema ab. Generell kommen in erster Linie die Inhaber, Geschäftsführer und Betriebs- bzw. Fertigungsleiter zu TOP-Veranstaltungen, ferner Leiter von entsprechenden Fachabteilungen (QS, Logistik, Personal, usw.) Bei breit angelegten Themen, z.B. Reengineering, kommen viele kleinere Unternehmen mit ihrem gesamten Führungsstab.

In einem Fragebogen, der nach der TOP-Veranstaltunge ausgefüllt werden soll, beurteilen Besucher die Veranstaltung. Darin wird u.a. gefragt, welche Erkenntnisse die Teilnehmer in ihren Unternehmen umsetzen wollen.

Mit dem britischen Programm Inside UK Enterprise und dem spanischen TOP-Programm besteht ein regelmäßiger, fruchtbarer Erfahrungsaustausch. Nach Abschluß der Aufbauphase von TOP besuchte eine Gruppe britischer Unternehmer als Sonderprogramm Veranstaltungen von sechs TOP-Gastgebern zum Thema Qualitätssicherung.

Session 3: Technology Demonstration in Enterprises

Mr. José Maria Ruiz Urchegui, ADEGI, Spain

BUSINESS TO BUSINESS INFORMATION EXCHANGE
A practical approach to Technology Transfer

ADEGI - an employer membership organisations view

I appear before you on behalf of ADEGI, the Gipuzkoa Entrepreneurs Association, in the Basque Country, which since 1993 has organised the TOP Programme Entrepreneurs Meetings achieving more than satisfactory results as will be described further on.

THE MISSION: "The Association of Entrepreneurs of Gipuzkoa, pledges itself to encourage enterprises, through the TOP Programme -Entrepreneurs Meetings- to set about innovation processes and continuous improvement taking as basic foundations the direct exchange from entrepreneur to entrepreneur of successfully carried out experiences.

The TOP Programme, likewise, assumes the challenge of linking the enterprises world and the training fields, at university level, technical schools and technologically, so that, this way, the integration of knowledge and experiences, which result in an improvement of the competitive feature of the enterprises, can be attained.

We commenced the Meetings with the idea of encouraging entrepreneurs to introduce improvements and innovations into their enterprises so that they could increase competitiveness and promote interentrepreneurial relations. We used the transfer or "entrepreneurial excellence" which was carried out by the host enterprises to the visiting entrepreneurs.

The outlook which our Association gives us shows us that quite often the day to day management work carried out by the entrepreneur, specially when he/she is at the head of the company, does not allow them to establish sufficient relations with the entrepreneurs in their immediate surroundings, nor with customers or suppliers.

The lack of time is a common illness which affects the era we live in. If these Meetings achieve anything, it is to communicate and contrast experiences among entrepreneurs. A significant achievement in this world which is ever changing and growing more competitive.

The TOP Programme characteristics:

* The proximity and manageability of the Meetings organised by ADEGI

* Crossborder collaboration as Gipuzkoa is a province which is a neighbour to France.

* The private identity of our Association, does not prevent us from establishing agreements with different governments Spanish as well as Basque.

Being geographically close also allows the Entrepreneurs Association to be in direct contact with the entrepreneurs interests and concerns as if it were a kind of "antenna". This is possible because the ADEGI staff members participate in each and every meeting with the host enterprises, thereby allowing for a continuous improvement of the Programme.

We consider the TOP Programme as the beginning of a more in depth benchmarking process through which enterprises can benefit together and prove their respective weaknesses. On the other hand, it disseminates "best practice" in an absolutely practical manner: leading enterprises which are not direct competition decide to learn from each other those functions which they do best.

From this perspective, we think one of the challenges for the near future is to establish a solid network between our Programme, IUKE and the German TOP, in this manner, we can obtain synergies which will allow us to advance and improve our respective offers in a more complete, consolidated and faster way. We have to improve the communication channels by establishing an efficient network between the three Meetings programmes and applying them to the benchmarking and best practices principles which I referred to before.

On the other hand I would like to stress that because we are a regional organisation this does not prevent us from extending TOP Meetings Programme to other provinces in the Basque Country as well as in the rest of Spain and the neighbouring French region of Aquitaine. The TOP Programme is propitiating a network of SME entrepreneurs locally as well as at a crossborder level.

The collaboration on both sides of the border in areas which are geographically adjacent has an important potential field for development, given that we commenced with very scarce relations and the contacts established were practically non-existent.

If the first edition's objective, carried out in 1993, was to transfer successful experiences from entrepreneur to entrepreneur, in 1994 we proposed to apply the Meetings formula to establish links between the entrepreneurial and educational worlds. Following along these lines, we have commenced a path for contacts and collaboration between enterprises and the Universities which is proving to be quite successful.

We are holding Meetings in the College for Engineers, the Business School, the School for Chemistry or in research Centres which is allowing the enterprises and the educational world to collaborate in a practical manner and attend to the needs and peculiarities of each.

We must admit on the other hand, that we were the first to be surprised by the enormous acceptance received from all the entrepreneurs in this Meetings Programme. Perhaps it's because we previously considered the entrepreneur, especially in small enterprises, to be people who weren't

interested in collaborating and relating to their colleagues, which in some cases may be competitors.

However, practice has shown us that the entrepreneurial world is anxious to open its doors and show what it's doing. because by showing one learns and there is nothing like admitting one's wrongs and another persons rights when the time comes to introduce changes and improvements in one's own enterprises.

Mr. Charles-Etienne Thomas, ADEPA, France

REFERENCES
A PROGRAMME FOR EXPERIENCE AND BEST PRACTICES EXCHANGE BETWEEN ENTERPRISES
(SUPPORTED BY THE FRENCH MINISTRY OF INDUSTRY)

"REFERENCES, an experience shared" is a programme developed at the initiative of the French Ministry of Industry. Its objective is to bring together industrial companies of different sectors to share and transfer their experiences.

This action is built around a catalogue presenting the enterprises which have executed successfully integration and organised visits. During a visit the host company presents the details of the different components of the project:

- position of the project or approach in the global strategy of modernisation and development of the enterprise: master schedule objectives and priorities...
- employers' motivation and contribution to the project performance
- means to perform the project: internal competencies and skills, partners, consultancy and choice of a solution,
- schedule of the project, its costs, profitability, difficulties encountered
- performance reached: technical, economical, organisational
- effects on commercialisation, organisation, market positioning of the enterprise, training of its personnel.

Demonstrations are also made, and debates take place. After a test phase (from February to July 1994) during which 50 host enterprises were selected, a second phase has just been completed.

The Ministry of Industry has wanted to evaluate the impact of the programme. The evaluation is based on the analysis of the information collected through the questionnaires that were given to each participant (visitors, host enterprises, representant of the Ministry) and on other information about the visitors (sector, number of employees, geographical origin).

The results presented below are concerned with the second edition of the catalogue and were collected from November 1994 to March 1995; 97 visits took place in 85 host enterprises and the number of visitors amounted to 600.

Three items of information were required:

- The visitors' attraction capability

  It has been relatively high and regional : 86% of visitors visited enterprises whose numbers of employees were different from their owns. The same percentage of enterprises visited other enterprises whose activities were different from their owns. 68% of the visitors travelled more than 100km; only 8% travelled more than 500km.

- The participants' satisfaction

  The visitors have considered this programme very interesting (63%) or just interesting (37%).

  95% of the visitors have considered that this programme has met their requirements; 72% of them work on such an IT integration project and 55% have come to validate an on-going approach in such a project.

  The host enterprises have considered "REFERENCES" very interesting (72%) or just interesting (28%); 74% of them think that such a programme improves the image of their own enterprise; 72% feel that this programme is a very good opportunity of opening and creating relationships with the industrial world.

- Stimulating effect with a view to creating a network

  52% of visitors wish to get into contact with the enterprise they visited and 60% of them envisage to make other visits; 70% of the host enterprises wish also to participate as visitors.

  The questionnaire has helped to confirm the foreseen evolution of the future catalogues. The participants wish to extend such visits to other areas of interest such as quality, human resources, EDI, management...

  They also require more demonstrations during the visits and other examples with a structured project approach.

  The third edition (June-December 1995) has just been published; 130 enterprises will participate. two themes have been selected: quality and integration through software.

Mr. Michael Vowinckel, IMK, Germany

Zusammenfassung der Präsentation des deutschen Projekts Technologie-orientierte Besuchs- und Informationsprogramme (TOP) beim TDAC-Workshop

Was unterscheidet TOP von anderen Möglichkeiten des Technologie-transfers?

Das Profil einer TOP-Veranstaltung (firm-to-firm visit) zeigt, daß besonders die Verknüpfung von Theorie und Praxis für TOP kennzeichnend ist: moderne Technologien und Strategien werden in TOP-Tagesseminaren meist sowohl in der Theorie als auch in ihrer praktischen Umsetzeung in der Fertigung des Unternehmens gezeigt.

Der dabei entstehende Erfahrungsaustausch zwischen den Spezialisten der gastgebenden Unternehmen und den fachkundigen Teilnehmern der TOP-Veranstaltung wird von beiden Seiten seht hoch geschätzt.

Wer kann gastgebendes Unternehmen bei TOP werden ?

Gastgeber im TOP-Programm sind technologisch führende deutsche Unternehmen, unabhängig von ihrer Größe. Sie müssen bereit sein, ihre Erfahrungen bei der Umsetzung moderner Technologien oder Strategien anderen Unternehmen weiterzugeben. Die gastgebenden Unternehmen erhalten von TOP keine Erstattung ihrer Auslagen. Dennoch arbeiten derzeit fast 50 führende deutsche Unternehmen, zum Teil mit Seminaren zu mehreren Themen bei TOP mit. Neben der Wirkung auf die Öffentlichkeit wird als Motiv häufig der Wunsch genannt, mit qualifizierten Fachleuten in Erfahrungsaustausch zu treten. Aber auch das Bestreben, nach der Wiedervereinigung Deutschlands ostdeutschen Unternehmen auf den Weg zu westdeutschen Qualitätsstandards zu helfen, war ein Motiv.

Wie hat sich TOP entwickelt ?

Seit 1992 haben rund 6.000 Führungskräfte an TOP-Veranstaltungen teilgenommen. Zur Zeit beteiligen sich etwa 50 Gastgeber mit rund 60 verschiedenen Themen an TOP-Programm. Es werden im Jahr 1995 rund 180 - 200 Veranstaltungen angeboten.

Wie werden Teilnehmer geworben ?

Pro Jahr werden zwei neue TOP-Kataloge herausgegeben, die alle Veranstaltungen enthalten. Durch gezielte Pressearbeit, Direct-Mail-Aktionen und gemeinsame Werbeaktionen mit den Gastgebern werden Teilnehmer

geworben. Die enge Zusammenarbeit mit den deutschen Industrie- und Handelskammern und den Spitzenverbänden der deutschen Industrie fördert ebenfalls die Teilnehmerakquisition. Die Teilnehmer zahlen nur eine Bearbeitungsgebühr von DM 150,- zzgl MwSt. pro Veranstaltung.

Themenschwerpunkte bei den TOP-Veranstaltungen

Nachdem anfänglich moderne Fertigungstechnologien im Mittelpunkt des TOP-Themenangebots standen, hat sich der Schwerpunkt des Interesses der Teilnehmer mehr und mehr auf moderne Unternehmensstrategien verlagert. Hier sind es besonders Themen der Gruppenarbeit und moderner Arbeitsstrukturen, die gefragt sind. Auch Umweltthemen werden zunehmend wichtiger.

Beurteilung der TOP-Veranstaltungen durch die Teilnehmer

Die Auswertung der TOP-Marktforschung beweist u.a.: Fast 90 Prozent der befragten Teilnehmer beurteilen TOP-Veranstaltungen als 'sehr gut' oder 'gut'. Ein großer Teil der Teilnehmer hat Maßnahmen im eigenen Unternehmen ergriffen, die Folge der bei TOP-Veranstaltungen gewonnenen Erfahrungen sind.

Wie gut informieren TOP-Veranstaltungen im Vergleich zu anderen Medien?
Die TOP-Marktforschung hat ermittelt, daß die befragten Unternehmen sich hauptsächlich in Fachzeitschriften (32%), auf Messen (27%) und auf Seminaren (24%) informieren, wenn sie etwas über neue Technologien und Strategien erfehren wollen.

Im Vergleich zu diesen Informationsquellen schneidet TOP mit seinen Veranstaltungen ganz hervorragend ab: 21% der Befragten fanden TOP zum Beispiel 'viel besser' und weitere 58% 'besser' als Fachzeitschriften, der bis dato wichtigsten Informationsquelle.

Synopsis

Durch seine einzigartige Kombination von Theorie und Praxis und die qualifizierten Programmangebote wird TOP sowohl von Teilnehmern als auch von Gastgebern hoch geschätzt. Als Informationsmedium über moderne Technologien und Strategien wird TOP besser als die anderen Wissenstranfer-Möglichkeiten eingestuft. TOP bewirkt nachweislich, daß die teilnehmenden Führungskräfte aufgrund der Erkenntnisse von TOP-Veranstaltungen das eigene Unternehmen umstrukturieren.

TOP hat sich also als ein sehr wirksames und besonders preiswertes Instrument im Technologie- und Erfahrungstransfer von Unternehmen zu Unternehmen bewährt. Es verdient darum die volle Unterstützung aller für Technologietransfer zuständigen Dienststellen in den EU-Mitgliedsländern.

Session 3: Technology Demonstration in Enterprises

Dr. Christian Brebeck, Bundesministerium für Wirtschaft, Deutschland

PROPOSED DEVELOPMENTS AND PERSPECTIVES.

Wir stellen uns natürlich die Frage nach möglichen europäischen Perspektiven von Programmen wie 'Inside UK Enterprise' und 'TOP'.

'Inside UK Enterprise' und die beiden 'TOP'-Programme haben schon eine europäische Dimension. Die Idee für 'TOP' erhielt ich von britischen Kollegen auf einer SPRINT-Sitzung bei der Europäische Kommission in Luxemburg. Die Kommission hat da bereits ihre Rolle als Katalysator erfolgreich gespielt. In Spanien hat die ADEGI, basierend auf dem britischen und dem deutschen Vorbild, auf regionaler Ebene, ähnliche Strukturen geschaffen, in die auch französische Unternehmen als Gastgeber einbezogen sind.

Zwischen den britischen, spanischen und deutschen Akteuren hat sich eine enge und fruchtbare Zusammenarbeit entwickelt. Wir lernen immer wieder voneinander. Die transnationalen Kontakte optimieren unsere nationalen Programme.

Britische Unternehmer haben bereits deutsche TOP-Gastgeber besucht. Britische und spanische Unternehmensvertreter treffen sich. Eine schrittweise Intensivierung der Zusammenarbeit im Rahmen der bestehenden Systeme liegt auf der Hand.

Ich freue mich, daß Europa sich so pragmatisch entwickelt!

Die engere Zusammenarbeit im Rahmen der bestehenden Programme ist die eine europäische Dimension.

Die andere Dimension ist, weitere Mitgliedstaaten und Institutionen in der Gemeinschaft für derartige Programme zu interessieren. Wie wir die Idee zu TOP vom Vereinigten Königreich übernommen haben, geben wir sie auch gern an andere Länder und Einrichtungen weiter. Zur intellektuellen Aufbauhilfe sind die britischen, deutschen und spanischen Akteure gern bereit. Hier könnte die Kommission wiederum die Rolle des Katalysators spielen.

Wir wünschen uns, daß andere Mitgliedstaaten oder Institutionen die Idee aufnehmen und vergleichbare Systeme entwickeln. Wir würden dann gern mit den neuen Partnern ebenso zusammenarbeiten wie jetzt unter uns.

Session 4: Policy Issues in Technology Demonstration

4.1 Timing and Integration of Demonstration-Based Technology Transfer

Mr Luigi LESCA, ENEA (I)

4.2 Demand Orientation in Technology Demonstration Activities

Mr Ken Guy, Technopolis (UK)
Mr Yves Hellot, ADEME (F)

Mr. Luigi Lesca, ENEA, Italy

TECHNOLOGY DEMONSTRATION AND APPLICATION CENTRES (TDAC) AT ENEA.

ENEA (The Italian Agency for New technologies, Energy and Environment) is one of the largest R&D institutions in Italy with a specific mission aimed at transferring its know-how, technologies and innovative products to the national industrial system, with special reference to the SMEs of the so called mature sectors due to their weight in the country's economy.

In order to accomplish that in the most efficient way, ENEA has devised an organisational structure where the technology transfer function is appropriately underlined.

ENEA used to be (until 1982) the national nuclear energy Committee: in this role it has developed a large number of in-house technologies and capabilities that more recently have been directed to a much broader spectrum of applications.

Know-how on materials, robotics and automation, lasers, etc., once concentrated on nuclear applications, turned out to be of great interest today when directed to the mechanical, textile and clothing, ceramic tiles, etc. fields.

In order to address the problem posed by a variety of new interlocutors and new needs, ENEA had to define a methodology of approach.

A "package" was set up with a number of items to favour the contact and gain the confidence of the entrepreneurs.

The TDACs are an item of the ENEA's approach.

Contrary to the experience of many other institutions, ENEA views TDAC's mainly as Technology Demonstrators, with specific (and usually) temporary mission.

In addition, in order to make more convincing and effective their role ENEA is usually locating them in an industrial environment, at the industry premises.

As examples of currently running ENEA's TDACs it is worth to mention the Centres for the Application of the laser and electron beam (named CAFL and CAFE, respectively) in metallurgical and mechanical applications and that concerning the DEA workstation (a venture co-funded by the EC SPRINT programme) for the design and commercialisation of ceramic tiles.

Mr. Ken Guy , Technopolis, United Kingdom

TECHNOLOGY DEMONSTRATION ACTIVITIES AND DEMAND

Route Map

- Technology Demonstration Activities in Research and Technology Organisations (RTOs)
- The Assessment of Demand
- Policy Implications

Notes

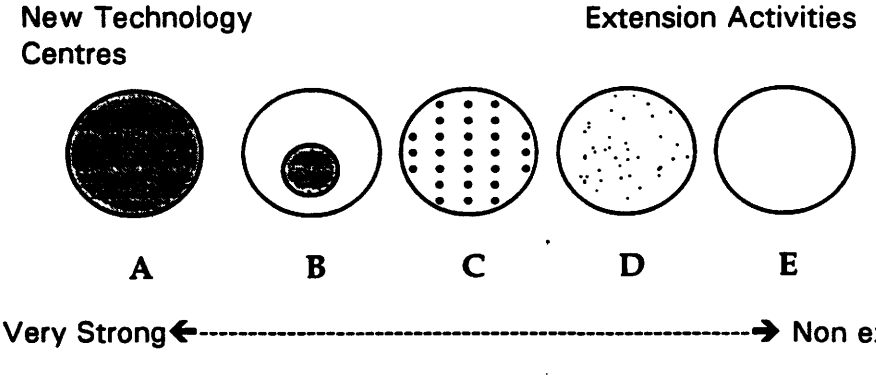
In this presentation we review the organisation and nature of technology demonstration activities in Research and Technology Organisations (RTOs)...

... before moving to an appreciation of the assessment of demand within these organisations

... and finally to the implications for policy at national and EU levels.

Policies have to be based on understanding.

Technology Demonstration Activities within RTOs



Notes

Technology demonstration is primarily a **function** conducted within a **centre.**

In the Exhibit above, the shading in each circle represents the strength, extent and organisation of technology demonstration activities within RTOs.

At one extreme (A) technology demonstration is the sole function of the RTO. An example is a **new technology centre** set up solely to demonstrate a new technology (lasers, multimedia, etc.). (B) depicts a centre within an RTO specifically set up to demonstrate technologies. (C) represents a systematic approach to technology demonstration across an RTO. (D) suggests a much less systematic approach, with technology demonstration constituting an occasional **extension** of existing activities, e.g. the demonstration of the results of an applied R&D project. (E) occurs when RTOs do not undertake technology demonstration activities.

In Europe, there are very few representatives of Type A. Many centres can be described as Type D (especially in the UK) Types C and B are models for RTOs wishing to approach technology demonstration in a more systematic fashion.

DemoFunk is more important than DemoCentres.

The Nature of Technology Demonstration Activities

- **Demonstration of Concept**
  - Low cost
  - Little need for subsidy
  - Attractive to R&D performers
  - RTOs are suitable venues

- **Demonstration of Everyday Operation**
  - High cost
  - Often need for subsidy
  - Attractive to SMEs
  - RTOs often not most suitable venues

Notes

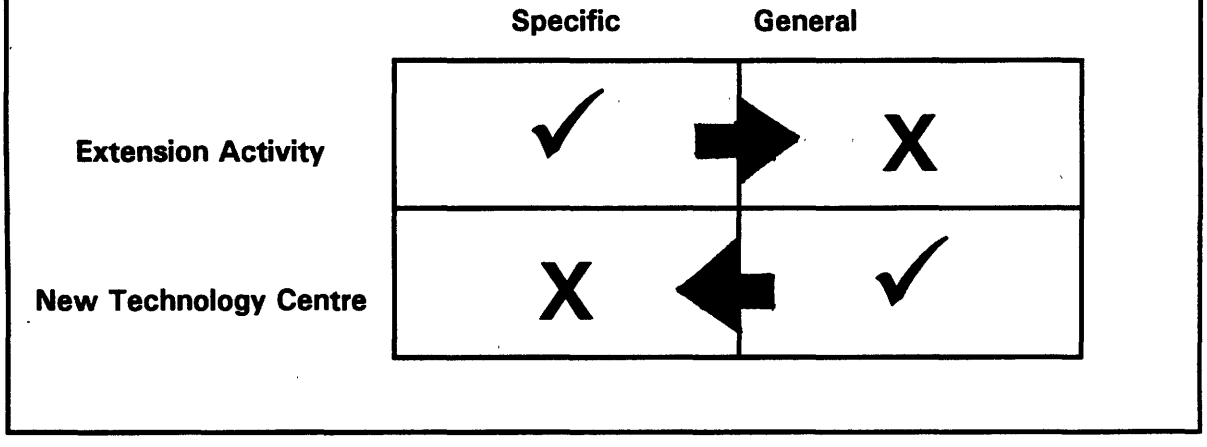
Technology demonstration activities vary enormously and it is important to distinguish between two extremes.

Many technology demonstrations aim to show that a **concept** works. R&D performers (usually larger firms) look to RTOs for demonstrations of this nature prior to undertaking further development themselves - sometimes in conjunction with the RTOs. This type of demonstration is a natural extension of the normal activities of an RTO (R&D, trouble shooting, service delivery).

In contrast, many firms - SMEs in particular - are only interested in demonstrations of technologies in **everyday operation.** They want to know that something will work 'on Monday morning'. They also want to know what the benefits will be. Often this requires *in situ* demonstrations and presentational skills few RTOs possess.

RTOs are suitable venues for some types of demonstration, but not for others.

Assessment of Demand for Technologies



Notes

However technology demonstration is structured within RTOs, assessments of demand are often inadequate.

When demonstration occurs as a result of the extension of an existing activity, (e.g. demonstration of a tool developed during the course of a typical trouble-shooting assignment), assessments of demand are often based on extrapolations of **specific** instances ("it worked for firm X, so Firms Y and Z will probably want it too). Formal assessments of **general** demand are rarely undertaken.

In contrast, when new technologies centres are set up to demonstrate and diffuse new technologies, **general** assessments of demand ("everybody is talking about multimedia so there must be an enormous demand for it") are rarely translated into **specific**, segmented assessments of demand amongst different markets and user types.

Few TDACs in Europe launch surveys prior to the introduction of demonstration activities.

Demand for What ?

	Technology	Demonstration Service
Demand	**High? - Necessary Low? - Undesirable**	**High? - Unlikely Low? - Likely**
Need	**High? - Desirable Low? - Undesirable**	**High? - Necessary Low? - Undesirable**

Notes

An RTO contemplating demand assessment has to make a distinction between demand for a **technology** on the one hand, and demand for a **demonstration service** on the other.

The difference between **demand** and **need** also has to be appreciated.

Demand for a technology can be high even if **need** is low. Conversely, **need** can be high but **demand** low. Diffusion is possible in the former case, but unlikely in the latter.

A demonstration service is warranted if it can be shown that a service of this nature is **needed** for diffusion to take place. This is despite the fact that **demand** for a demonstration service will probably be low (although firms take advantage of demonstration services offered by RTOs, few actively seek these services).

Understanding these distinctions is vital if RTOs are to approach demonstration activities in a systematic fashion.

An Integrated Approach to Demand Assessment

- **Demand for a Solution**
  - Is a technical solution required?
- **Demand for a Technology**
  - Is this technology of interest?
- **Demand for a Demonstration**
  - Would a demonstration help?
- **Demand for Form?**
  - What kind of a demonstration would help?
- **Demand for Content**
  - What information should the demonstration provide?

Notes

There is an overwhelming need for 'demand assessment' methods to be improved.

This involves adopting an approach which looks at technology diffusion from the perspective of an adopting firm and asks a series of hierarchical questions covering the demand/need for solutions, technologies, and demonstrations.

Demand assessment has a logic which allows the customisation of demonstration activities.

The Cost of Assessing Demand

- **New Technology Centre**
  - Large target audience
  - Questionnaires plus some direct questioning
  - Moderate to high cost per exercise
  - Low number of regular exercises
  - Overall costs are acceptable
- **Extension Activity**
  - Small target audience
  - Direct questioning
  - Low to moderate cost per exercise
  - Large number of irregular exercises
  - Overall costs are unacceptable
  - Need to think strategically about clustering demand assessment and demonstration activities

Notes

The cost of assessing demand is crucially dependent on the organisation and nature of the demonstration function in RTOs.

For technology demonstration centres promoting new generic technologies, questionnaires directed to large target audiences have high unit costs - but their one-off nature makes overall costs acceptable.

Extension activities, on the other hand, have lower unit costs but are needed much more frequently, on an *ad hoc* basis. A systematic, coordinated approach to demand assessment is needed to cut costs to acceptable levels.

Rationalising demand assessment means thinking strategically about overall operations within an RTO.

Policy Implications

- Initiate schemes which help RTOs rethink strategy and the role of technology demonstration activities
- Initiate schemes which introduce and familiarise RTOs with best-practice demand assessment
- Initiate schemes which help firms (especially SMEs) appreciate that RTOs provide a useful service via their technology demonstration activities.
- Initiate schemes which help firms access 'everyday operation' demonstrations
  - via subsidy of capital equipment in RTOs and firms
  - via national/European firm best-practice networks
  - via local/regional RTO/firm best-practice networks

Notes

Few RTOs think about demonstration activities in a strategic sense. There is scope for national and EU schemes which help them restructure, reorient and integrate technology demonstration into profit stream activities.

Few RTOs conduct adequate demand assessments. They need to be 'shown the ropes'.

Demonstration activities are rarely visible to firms (SMEs in particular) as a 'service' offered by RTOs. There is scope for awareness and signposting initiatives.

SMEs are best persuaded of the merits of technology adoption by 'everyday operation' demonstrations. There is scope for a number of schemes designed to do this.

Policies which facilitate technology demonstration are an important component of innovation policy portfolios.

Mr. Yves Hellot, ADEME, France

PROGRAMME DE SOUTIEN À DES PROJETS DE DÉMONSTRATION D'ÉCONOMIE D'ÉNERGIE DANS L'INDUSTRIE DE L'AGENCE DE L'ENVIRONNEMENT ET DE LA MAÎTRISE DE L'ENERGIE.

L'Agence de l'Environnement et de la Maîtrise de l'Energie, établissement public français, est chargée de par la loi d'orienter et d'animer la recherche, d'inciter, d'informer et de former dans les domaines suivants:

- ✓ maîtrise de l'énergie et des matières premières
- ✓ promotion des énergies renouvelables
- ✓ promotion des technologies propres et efficaces en énergie
- ✓ minimisation, récupération et valorisation des déchets
- ✓ prévention et réhabilitation des sols pollués
- ✓ prévention et protection de la pollution de l'air
- ✓ lutte contre le bruit

Pour l'ensemble de ces domaines, l'Ademe intervient de la science jusqu'au marché et ses applications (science-technologie-marché) ce qui comprend le soutien et la promotion de:

- ✓ la recherche appliquée,
- ✓ l'expérimentation et le développement,
- ✓ la démonstration,
- ✓ les campagnes d'information et la formation,
- ✓ la diffusion des technologies.

L'Ademe pour assurer l'ensemble de ces missions d'incitation et de diffusion est dotée en 1995 d'un budget total d'intervention de 1.070 MFF dont les deux tiers proviennent de produits de taxes sur la pollution (déchets, air, huiles usées et bruit) et un tiers de dotation de l'Etat français.

Programme de démonstration

De 1975 à 1992, l'Ademe à financé un programme de projets de démonstration destinés à promouvoir des opérations innovantes dans l'Industrie. Il s'est agi au travers de cette procédure d'aide de soutenir en aval de la RD la première réalisation innovante d'un produit ou procédé nouveau à un stade où les risques financiers et techniques apparaissaient importants. L'enjeu et l'objectif de la procédure étaient de favoriser l'exploitation d'un gisement d'économies d'énergie au travers de la double démonstration de la faisabilité technique et de la rentabilité économique d'un projet susceptible d'être ensuite reproduit par d'autres entreprises confrontées à des situations analogues.

En contrepartie de l'aide de l'Agence (plafonnée à 50% du coût total du projet innovant), une campagne de mesures (financée à 100% par l'Agence) réalisée par un tiers expert, était nécessairement incluse dans le projet. Du fait du caractère démonstratif de l'opération, les résultats avaient vocation à être publics et l'industriel utilisateur devait accepter contractuellement les visites de son site par d'autres industriels. Le bénéficiaire de l'aide pouvait être indifféremment l'utilisateur final, un équipementier ou une ingénierie.

Pour assurer la promotion et la diffusion des résultats d'une opération innovante, l'Agence organisait des journées techniques, des visites d'installation, etc. et publiait des brochures diffusées par les périodiques professionnels (notamment Energie Plus de l'Association Technique Energie et Environnement).

Résultats et bilan du programme

En un peu plus de quinze ans 400 projets de cette nature ont été aidés pour un investissement total d'environ 4 milliards de FF. Le budget qui lui a été consacré s'est élevé à 400 MFF. Le programme a permis sur cette période de réaliser un peu moins d'un million de Tep* d'économies d'énergie, soit environ le huitième de l'ensemble des économies d'énergie effectivement comptabilisé dans le secteur industriel.

Les bilans et évaluations qui ont été effectués au cours du temps par l'Agence an 1984, 1990 et 1995 ont permis de tirer les enseignements suivants:

⇨ Environ trois opérations sur quatre sont un succès, c'est à dire qu'elles ont atteint les objectifs initialement fixés du point de vue technique et économique.

⇨ Le potentiel du marché sur les techniques ou procédés aidés était en général très largement surévalué. Par exemple sur la période 1986-1991, une opération n'a généré en moyenne qu'une seule nouvelle opération en France et quatre opérations en dehors de France, alors que le potentiel était très largement supérieur (dans le rapport d'au moins cinq).

⇨ De nombreuses opérations sont très souvent très spécifiques et très peu reproductibles; ce sont certes des opérations innovantes mais des quasi-investissements. C'est tout spécialement le cas de nouveaux procédés de fabrication qui sont portés par l'utilisateur final et difficilement commercialisables.

⇨ Quelques opérations portant en général sur un équipement (échangeurs de chaleur, PAC, CMV, moteurs électriques...) ont offert par contre une large diffusion.

⇨ De manière assez générale l'Agence n'a pas assuré un suivi assez fin de l'évolution du marché de ces équipements et procédés.

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* (tonne d'équivalent pétrole)

⇨ Assez souvent l'on constate que l'effort commercial des équipementiers ou ingénieries est insuffisant et mal suivi.

⇨ Par branche industrielle les principaux secteurs bénéficiaires ont été: les industries agro-alimentaires, la sidérurgie, la chimie, les matériaux de construction et les papeteries.

⇨ Par filière technologique: 35% portent sur des nouveaux procédés de fabrication, 20% sur de la récupération-valorisation énergétique d'effluents ou de déchets, 20% sur des nouveaux usages efficaces de l'électricité (PAC, RMU, fours, induction) et 15% sur des techniques de séchage performantes.

Conclusion

Le programme d'opération de démonstration qui a été conduit en France de manière continue sur environ quinze ans a eu un impact significatif au plan des économies d'énergie (un sixième des économies d'énergie effectivement constatées dans le secteur industriel). Un franc d'aide a induit environ dix francs de chiffre d'affaires cumulé chez les constructeurs et équipementiers français. Cependant, l'ampleur de la diffusion des nouveaux produits ou procédés est faible par rapport au marché escompté. Seules un peu plus d'un tiers des opérations ont généré des duplications. Enfin, le soutien à ce type de projet répond à un réel besoin et à une demande clairement exprimée aussi bien des équipementiers que des entreprises utilisatrices finales.

Summary of 2nd day

Mr Klaus Schwall, European Commission, DG XIII/D/4, Luxembourg

I have the pleasure of thanking you for your very interesting contributions. The purpose of the meeting was to exchange knowledge and experience on technology demonstration activities in the EU. I think that was very successful. All participants have probably been surprised by the variety of approaches that exists, and since this is still an activity one could say in its infancy, the methods and recipes that are proposed are also very diverging.

I would first thank very much the authors of the study. They have done a very good job in the empirical field. Now we have the assurance that TDACs exist and even if they do not exist under this label at least the demonstration function exists and becomes more and more apparent and visible. At the same time the authors of the study have developed an analytical treatment for the functional roles of such centres, and they did also tackle managerial issues and strategies. All this has led us finally to discuss policy issues at Member States' or Community level.

The results are very encouraging for all of us. As I mentioned before it is only a starting point, and I would underline two points of particular interest in my opinion:

In following the debate, I tried to understand in what the TDACs and later on the firm-to-firm demonstration activities consist, applying constantly as a criteria whether the activities presented fall into that range or not the definition given by the study: 'TDACs offer demonstration of new technologies to enterprises as their main activity and they will do this in a systematic approach'. Most of the times I found the criteria was met, leaving however still some questions: If one cuts away all the other innovation supporting activities of TDACs then one has to find out what the demonstration activity as such really is. This is for me still a little bit enigmatic. Demonstration is not simply a showcase where you show someone a product and he is convinced by looking at it. It appears to be a complicated process that will be present in various activities of a decision making cycle. The aim of this activity is apparently to change the opinions and attitudes of the participants. Thus, it is an interactive process and I found it very helpful that at one time it was said there must be two sparks that cause the reaction. This process character of demonstration activities and its linkage to other supporting activities seems to be something that has to be investigated further in the future.

Another aspect is that many of the tasks that were mentioned to be part of a kind of an "ideal TDAC" are rather extensive, and one is left with the impression there must be very few TDACs that can take the risk of doing all of them. Let me very briefly mention a few of them: TDACs should maintain neutrality, have an up-to-date and relevant technology portfolio, be independent, have a good own knowledge base, keep confidentiality, but be easily accessible and highly visible, have proximity to their clients (SMEs), have the same language and culture as the user, have access to foreign technology as well, be demand-led but at the same time be ahead of the general state of awareness, be pro-active and in search of potential users, but not distort competition, and many more.

This gives me the impression that there are many conflicting interests, conflicting tasks for TDACs that cannot simply be listed to describe "the" functions of the TDAC. Indeed, one has to check the trade-offs and the bargains inherent in such a complex mix of activities, and this brings us to their strategies and priorities. We find that first the function as such is

a process and second the function is ambiguous, it's conflicting. We encounter this question at the organisations' level of TDACs, where a choice is to be made between business opportunities and public service. We find it at the sector level, where we the boundaries of the firms and their functions are blurred. This ambiguity will also influence our analysis of a national innovation infrastructure and of a systems approach to innovation.

Finally, even at the policy level one has to make a decision. Is it enough to state that information is a public good, and that there is a deficiency of the market justifying public resources, or will there be a need for an evaluation of the impact, showing us when we do have to stop? What is really the cost/benefit ratio of such operations? In short, my impression is that the topic needs further academic investigation, but with very solid focus also on the real business needs of the participants and on the sectoral structure of these innovation services.

In the area of policies, we have had the presentation of a wide range of policy measures that could be taken. Two alternative ways to demonstrate were presented: company-to-company schemes and technology demonstration centres. At the end of this workshop it can indeed be said that these are not opposing, but mutually assisting activities, and means and ways should be found to make best use of both approaches.

That brings us to the question of Community support. It was often said during the workshop what the Commission should do at the European level; at the same time one may also ask what the Member States could do at the national and regional level, since the Commission is not automatically in a better position to develop fresh ideas and to stimulate the improvement of such demonstration activities. We will need to learn mutually about new policy concepts and that seems to me a longer term process that is inevitable. For the time being, the information made available in this workshop will, I hope, rapidly diffuse in the Directorate responsible, and nourish the process of exchange of experience in this field among the participants.

To conclude I would like to thank you very much for all the efforts and the patience devoted to the preparation of and participation in the workshop. My thanks include in particular the translators. I wish you a pleasant trip home and thank you very much.

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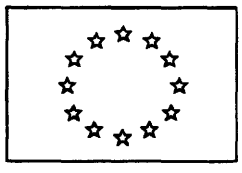

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